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Sylvatic Plague*

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THE Committee on Sylvatic Plague has collected, in coöperation with the state health officers and Dr. C. R. Eskey, U. S. Public Health Service, statistical data concerning the extent of human and rodent plague as well as *Pasteurella pestis* infection of fleas and other insects on the American Continent. The pertinent observations may be summarized as follows:

EPIDEMIOLOGICAL OBSERVATIONS DURING 1937

I. HUMAN PLAGUE

Two human cases of plague have been bacteriologically proved, one in Nevada and one in California. One terminated fatally. The histories contain observations of considerable interest:

Nevada Case—A university professor, age 64, while returning from a one day outing on May 28, 1937, from his summer home at Zephyr Cove, Lake Tahoe, felt tired. On May 29 he had a severe chill followed by nausea and vomiting and later high fever. He became rapidly worse, began to have general aching pains throughout, more marked in the lower extremities and left groin. He was hospitalized on May 30 with a left inguinal bubo and a rectal temperature of 104.6°. On the middle third of the inner surface of the left tibia a small red area resembling a fleabite was present. This lesion changed into a necrotic scab and ulcer which healed very slowly. The puncture fluid of the edematous tender lymph node secured on May 31 yielded bacterioscopically and by culture *P. pestis*. The blood culture remained sterile. Intramuscular administration of 100 c.c. dry anti-plague serum of the Pasteur Institute and blood transfusions lowered the temperature. The patient developed a cough, but repeated examinations of the sputum failed to show plague bacilli. A transitory toxic nephritis retarded the recovery, and the patient was discharged on the 26th day of his illness.

Although infected rodents were not found in the vicinity of the summer home, fleas carrying plague bacilli were discovered in the region. The plague ulcer, which led to the development of the left inguinal bubo, resulted from a fleabite contracted on May 24 when the

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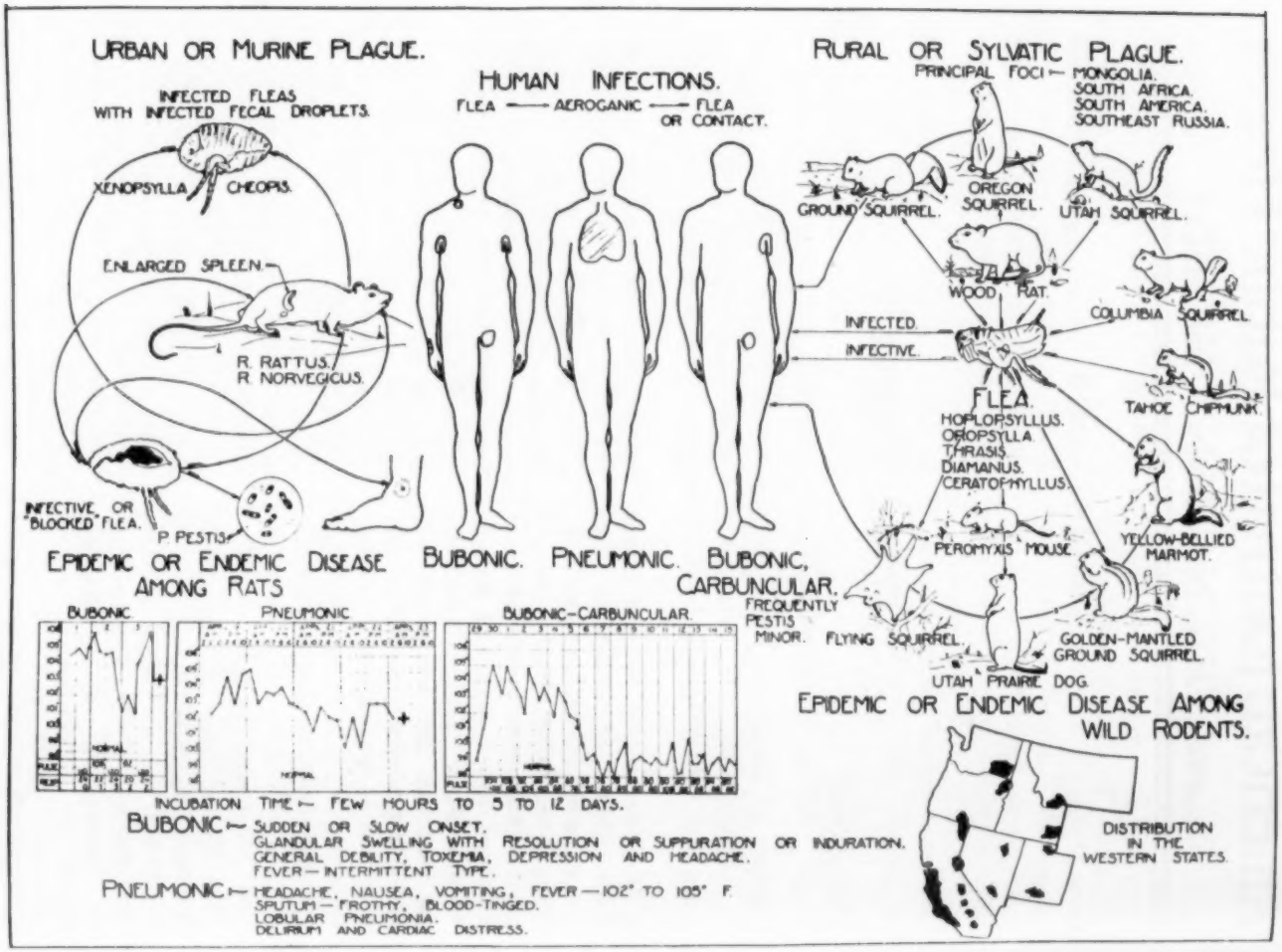
URBAN OR MURINE PLAGUE.
INFECTED FLEAS WITH INFECTED FECAL DROPLETS.
XENOPSYLLA CHEOPIS.
ENLARGED SPLEEN.
R. RATTUS.
R. NORVEGICUS.
INFECTIVE OR "BLOCKED" FLEA.
P. PESTIS.
EPIDEMIC OR ENDEMIC DISEASE AMONG RATS
HUMAN INFECTIONS.
FLEA — AEROGANIC — FLEA OR CONTACT.
BUBONIC. PNEUMONIC. BUBONIC, CARBUNCULAR.
FREQUENTLY PESTIS MINOR.
RURAL OR SYLVATIC PLAGUE.
PRINCIPAL FOCI — MONGOLIA. SOUTH AFRICA. SOUTH AMERICA. SOUTHEAST RUSSIA.
GROUND SQUIRREL.
OREGON SQUIRREL.
UTAH SQUIRREL.
WOOD RAT.
COLUMBIA SQUIRREL.
INFECTED.
INFECTIVE.
FLEA.
HOPLOPSYLLUS. ORIOPSYLLA. THRASIS. DIAMANUS. CERATOPHYLLUS.
TAHOE CHIPMUNK.
PEROMYXIS MOUSE.
YELLOW-BELLIED MARMOT.
FLYING SQUIRREL.
GOLDEN-MANTLED GROUND SQUIRREL.
UTAH PRAIRIE DOG.
EPIDEMIC OR ENDEMIC DISEASE AMONG WILD RODENTS.
DISTRIBUTION IN THE WESTERN STATES.
BUBONIC
PNEUMONIC
BUBONIC-CARBUNCULAR
INCUBATION TIME — FEW HOURS TO 5 TO 12 DAYS.
BUBONIC — SUDDEN OR SLOW ONSET. GLANDULAR SWELLING WITH RESOLUTION OR SUPPURATION OR INDURATION. GENERAL DEBILITY, TOXEMIA, DEPRESSION AND HEADACHE. FEVER — INTERMITTENT TYPE.
PNEUMONIC — HEADACHE, NAUSEA, VOMITING, FEVER — 102° TO 105° F. SPUTUM — FROTHY, BLOOD-TINGED. LOBULAR PNEUMONIA. DELIRIUM AND CARDIAC DISTRESS.

patient had worked in and around his summer home. The anti-plague serum was unquestionably responsible for the prevention of a septicemic state and the uneventful recovery.

California Case—A 7 year old girl with a history of having been bitten by a chipmunk on August 10, 1937, while on vacation at Huntington Lake, Fresno County, complained on August 14 of pain in the left arm and shoulder, vomited, had high fever, and an unusually rapid pulse. She was hospitalized on August 16, temperature of 104° F., W.B.C. 26,600, and an indurated mass in the left axilla. Sulphanilamide was given internally and local compresses were applied. A surgical exploration of the axilla on August 17 revealed an edematous infiltration and a few enlarged lymph nodes. On the 18th the patient was toxic and irrational, showed a petechial rash on the extremities, and despite a blood transfusion expired early in the afternoon. An antemortem blood culture yielded Alpha streptococci and *P. pestis*.

According to reports made by the Forest Ranger stationed at the Lake, an epidemic disease had appeared among the rodents of the area and had greatly reduced the population during the month of August. The examination of 434 rodents (218 *Citellus beecheyi*, 106 Golden mantled squirrels, 86 chipmunks, flying squirrels, rats and mice) revealed 3 ground squirrels with anatomical and bacteriologically proven lesions of plague. In addition, by *mass inoculation of organ suspensions* (8 pools) *into guinea pigs*, latent plague was demonstrated in chipmunks, Golden mantled and flying squirrels as well as mice. Infected fleas were detected through the customary injection of triturated suspensions of the insects. In 48 pools tested, 6 were found to contain fleas carrying *P. pestis*.

These two observations on human plague emphasize again the following important facts:

1. Since plague infections may be encountered anywhere in the Sierra Nevada regions, it is imperative that the differential diagnosis be carefully weighed and surgical procedures deferred until the nature of the infective process has been established. Lymph node punctures are most useful in making an early diagnosis.

2. The early use of anti-plague serum, which is available at the Hooper Foundation and the U. S. Public Health Service laboratories in San Francisco and Hamilton, Mont., is definitely indicated.

3. The owners or guests of summer homes visiting infected areas should be instructed to rat and rodent proof their buildings and, if practical, institute measures which will reduce or eliminate the flea population in their immediate surroundings.

4. With unremitting insistence, the public, in particular children, should be warned not to touch or to play with chipmunks or other rodents in or around regions in which sylvatic plague has been demonstrated.

5. The Forest Ranger should immediately report noteworthy rodent mortalities to headquarters in order that the nature of the epizoötic may be determined.

6. In recognition of the inherent danger in transferring plague to human habitations through wild rodents used as cage pets, the California State Department of Public Health in an official order dated September 14, 1937, prohibited the shipment or sale of chipmunks, Golden mantled squirrels, or other wild rodents unless these animals are held in quarantine for 2 weeks prior to shipment or sale. Consignments of rodents trapped in areas in which an animal has been found to be plague infected must be destroyed. It is recommended that similar steps be taken by the health officers in other states.

II. RODENT PLAGUE (ANATOMICAL AND LATENT)

(1) *California*—The experiences of the past 3

years confirmed previous observations that rodents with anatomical lesions of plague may be discovered late in the season in regions in which the infection is operative in epidemic distribution. Thus it is by no means surprising that, late in September and October, 2 dead and 1 sick Beecheyi squirrels with plague lesions were dissected in the Huntington Lake area. On the other hand, the gross examination of over 6,556 small animals between May 12 and July 10, 1937, in the Lake Tahoe area failed to detect plague. Despite the demonstration of *P. pestis* in several pools of fleas collected in the Big Bear and Barton Flats areas of San Bernardino County, no anatomically marked rodents have been found among 2,255 animals. In fact, rodent plague has not been recognized in the county. The finding of plague infections without visible lesions in Oregon squirrels during the survey activities in 1935 in Lassen County prompted a radical change of the methods dealing with the examination of wild rodents during the month of August. Pieces of spleen, liver, and lymph nodes were removed from every animal during dissection. In trying out this new procedure, the organs of from 5 to 90 rodents were placed in glass stoppered bottles carefully iced and sent to the laboratory. They were washed with salt solution, ground with sand, and a proportion of 5 to 10 per cent suspended in salt solution. Cultures on blood plates were made and, if the material was not too heavily contaminated with *B. coli* and *B. proteus*, 1 to 2 c.c. of the suspensions were inoculated subcutaneously into guinea pigs. When too heavily contaminated, the injections were made intracutaneously. It is now recognized that the pools should not include the organs of more than 10 to 15 animals. Although in no instance were plague bacilli grown in the cultures prepared from the suspensions, 13 guinea pigs injected with different pools succumbed to plague as follows:

El Dorado County—132 rodents examined

October 4: 1 pool of 7 Beecheyi squirrels, 5 chipmunks, 2 wood rats, 2 Alexandrinus rats, and 3 Golden mantled squirrels.

October 19: 1 pool of 6 tamarack squirrels (*Sciurus douglasii*). Infected fleas had been found on this species in the same area in 1936.

Fresno County—515 rodents examined—98 pools of 434 animals

September 9, 1937: 1 pool of 5 chipmunks (Eutamias)

September 14, 1937: 1 pool of 3 Beecheyi squirrels

October 2, 1937: 1 pool of 9 golden mantled squirrels (Callospermophilus)

October 2, 1937: 1 pool of 14 chipmunks

October 9, 1937: 1 pool of 1 flying squirrel (Glaucomys sabrinus)

October 10, 1937: 1 pool of 2 white-footed mice (Peromyscus)

November 4, 1937: 1 pool of 6 golden mantled squirrels

The cadavers of the flying squirrels and of the field mice were available for a painstaking examination. Neither gross nor microscopic study revealed inflammatory lesions. The plague bacillus *was, therefore, present as an inapparent, invisible infection* in an undiminished state of invasiveness; the guinea pigs injected with the suspensions succumbed to pure *P. pestis* infections in from 5 to 8 days. None of the organs of the other rodents revealed lesions on inspection at the laboratory, and the personnel of the field survey crews consisted of exceedingly well trained observers who would have readily recognized even the smallest markings of plague. The incidence of invisible *P. pestis* infection among the rodents of the Huntington area may be tentatively estimated as follows: Beecheyi squirrels 3 in 253, Golden mantled squirrels 15 in 130, chipmunks 19 in 100, field mice 2 in 9, and flying squirrels 1 in 1.

During the latter part of 1937, 233 pools prepared from the organs of 1,380 rodents shot or trapped in 15 counties of California in which sylvatic plague was known to exist failed to infect guinea pigs.

Latency as a phase of an infectious disease is a well recognized biological phenomenon. Although first established by Swellengrebel and Hoesen [1] for *P. pestis* infection in rats in Sumatra, and then by William and Kemmerer [2] for the same rodent in New

Orleans, it has with increasing frequency been mentioned from the sylvatic plague areas in Southeast Russia and in the Trans-Baikal by several investigators. Nikanorov (1925) and Gaiski (1926), based on careful observations, came to the conclusion that susliks (*Citellus pygmaeus*) and large gerbilles (*Rhombomys opimus*) may become carriers of the plague bacillus and thus transfer the virus from one season to another. Latent and chronic plague infection involving not less than 20 per cent of the susliks in the steppes of the Ural has been studied by Konstansov,[3] and Syssine [4] saw it in tarabagans.

The demonstration of latent plague in the rodents responsible for sylvatic plague on the American Continent is a biological process which had to be anticipated. Doubtless it would have been discovered long ago had not the laborious technical difficulties been a deterrent factor. At least, in California the examination of organ pools will greatly help to clarify the epidemiology of plague among the rodents and the occasional human infections, although the elucidation of the causes remains for the present a fascinating problem. For example, one would like to know if an invisible infection may be converted into a manifest process. Grikurov, in a recent paper from the North Caucasian anti-plague organization, presents suggestive evidence that malnutrition or other environmental conditions may act as provocative factors and transform a latent into an active process, thus serving as supplying the seeds for plague epizoötics early in spring. In this connection, it must be mentioned that the plague bacilli isolated from the guinea pigs, which succumbed to organ pool injections, had in the mouse pathogenicity test the same degree of invasiveness as those cultured from infected fleas or human tissues. Approximately 12 to 24 bacilli are required to cause an infection of the mouse by the intraperitoneal route.

Nothing is known concerning the species disposition of the rodents involved in the plague areas. Individual variations in the disposition induced by biological changes are quite important. Thus it was found by Tinker and Kalabuchov that the young *Citellus pygmaeus* are the most susceptible to plague, then the adult females, and the least susceptible are the adult males. Finally, ecological and even climatological factors affecting the nutrition and population numbers greatly influence the susceptibility and the character of the plague infections.

The Russian investigators have used skin tests and serological procedures to detect invisible plague in rodents. Grikurov [5] found that the sera of old *Citellus pygmaeus* contained agglutinins against *P. pestis*. He reasons that the increasing immunity of the rodent population, reflected in the serum reactions, may play an important rôle in the disappearance of the epidemic. That sub-lethal infections may be responsible for a part of the population immunity is fully recognized. However, two other factors play an equally important rôle. The weeding out of the susceptibles and the hereditary transmission of the resistance of the parent rodents to subsequent generations has been proved for rats, but has not been extensively studied on squirrels and other wild rodents. In view of the recent reports by Pirie (1936) that the South African plague strains obtained from both human and animal sources reveal a steady diminution in virulence, it is obviously desirable to estimate with special care, by using quantitative methods, the degree of virulence of every strain that may be isolated from wild rodents on the American Continent.

Contrary to the belief too often held

by the laity and even by those who are familiar with certain phases of plague, an epizoötic among wild rodents is by no means always followed by human *P. pestis* infections. The great foci of sylvatic plague in Russia furnish many convincing examples. During June, 1913, a severe epizoötic affected the suslik population of the Astrakhan steppes in the vicinity of two villages with a population of 6,000. At least 75 per cent of the 1,243 cadavers of susliks and hares scattered over the pastures proved to be plague infected; yet no case of human plague was diagnosed. Similar situations have been observed in 1930 in the steppes of the Ural. Although the factors influencing this low transmissibility are entirely unknown, these mass observations should at least alleviate to a certain extent the fear which the presence of sylvatic plague creates among misinformed groups of people.

(2) *Idaho*—According to L. J. Peterson, Director of Laboratories, the Plague Field Laboratory and the U. S. Public Health Service survey crews examined 2,213 *Citellus armatus*. In June, Dr. C. R. Eskey, U. S. Public Health Service, in charge of Plague Suppressive Measures, demonstrated *P. pestis* by mass inoculation of tissues from 47 *Citellus armatus* secured 15 miles north of Lava Hot Springs, Bannock County.

(3) *Montana*—According to Dr. W. F. Cogswell, Secretary of the Montana State Board of Health, three traveling field laboratories (one state and two U. S. Public Health Service) examined 3,204 rodents. Dr. C. R. Eskey demonstrated *P. pestis* in the tissues of 3 *Citellus elegans* (July 23, Dillon, Beaverhead County, August 20 and 23, Cameron, Madison County). The animals exhibited lesions of plague, in fact, one (August 23) was found dead as a result of a *P. pestis* infection.

(4) *Nevada*—The detailed surveys conducted both by the California and the U. S. Public Health Field Laboratories and the examination of many rodents failed to demonstrate gross anatomical rodent plague, although infected fleas were found.

(5) *Oregon*—Dr. F. D. Stricker reports that the Oregon Mobile Laboratory examined 4,973 rodents and collected 10,903 fleas. The tissues of 1 *Citellus oregonus* shot in May in Grant County and 1 *Citellus columbianus*, Wallowa County (in June) were proved by Dr. C. R. Eskey to be infected with *P. pestis*. No new areas of sylvatic plague were discovered.

(6) *Utah*—E. H. Bramhall, Director, Division of Laboratories, reports that in June the fleas removed from perfectly healthy *Citellus grammurus* near Morgan, Wasatch County, proved to be infected with *P. pestis*. The U. S. Biological Survey discovered sick *Citellus armatus*, and subsequently the Field Laboratory secured tissues from one animal which were proved by Dr. C. R. Eskey to be infected with *P. pestis*. This epizoötic was in progress in Northeastern Utah near Weber, Wasatch County.

(7) *Washington*—Dr. A. U. Simpson, Chief, Division of Laboratories, Washington State Department of Health, in submitting the report by L. J. Hughes, stresses the fact that although the examinations of 1,334 rodents and wild animals of various sorts failed to reveal gross anatomical plague, batches of 33 and 18 fleas, respectively, and 3 and 5 lice, respectively, removed from 21 and 13 *Citellus townsendi* in Adams County were found by Dr. C. R. Eskey to be plague infected. Thus the existence of sylvatic plague in one of the most northern points in the United States has been definitely established, and the nature of certain fatal epizoötics among rodents during 1914–1915 and 1931–1932 may ultimately be clarified.

The survey studies conducted on a scale hitherto unknown in the annals of sylvatic plague on the North American Continent have amply confirmed the suspicion that the infection is widely distributed, but difficult to recognize without mass inoculations of tissues or fleas. To the list of rodents that suffer from spontaneous plague previously reported must now be added the Sierra Nevada flying squirrel [*Glaucomys sabrinus lascivus* (Bange)] and Golden mantled squirrel [*Callospermophilus chrysodeirus chrysodeirus* (Merriam)]. • Since infected fleas have been removed from the Townsend squirrel (*Citellus townsendi*), presumably this rodent is also a host for the plague bacillus.

III. SURVEYS ON INFECTED FLEAS

It has always been a disconcerting fact that in a number of instances the epidemiology of human plague (1 case 1933, 3 cases 1936) could not be explained since the anatomical examinations of the rodents shot or trapped in the vicinity of the cases yielded negative findings. Thus the sources and the spread of the plague bacillus were shrouded in a discomforting mystery. One should have recalled that Kitasato, the Indian Plague Research Commission, and in particular Swellengrebel and Hoesen had found many years ago that in instances where infected rodents were scarce or apparently absent, it was comparatively easy to collect plague infected fleas for adequate examination. During 1936 the subcutaneous inoculations of suspension of crushed fleas removed from wild rodents into guinea pigs were conducted on a large scale. A number of important findings deserve recording:

(1) *California*—Approximately 104,000 fleas collected from 30,332 squirrels, ground-hogs, chipmunks, mice, etc., revealed in 26 pools of 1,016 the existence of plague infected fleas on animals which had anatomically been declared as non-infected. The positive findings were made in the following counties:

El Dorado County—Suspected area, 204 pools of 7,675 fleas from 5,143; 16 fleas collected from 27 *Callospermophilus chrysodeirus* infected guinea pigs with plague.

In an adjacent county, Douglas County across the line in Nevada, in which 1 case of human plague had been diagnosed, the inhabitants of a cottage complained of being annoyed by the large number of fleas within the building. *Ten fleas were collected from the linen sheets of a bed which was constantly in use. By inoculation, these insects proved to be infected with P. pestis.*

Fresno County—Newly infected area; 6 of 48 pools including 2,041 fleas from 1,322 rodents contained infected fleas.

9 fleas from	1	dead Beecheyi squirrel
187 fleas from	56	normal Beecheyi squirrels
49 fleas from	139	normal chipmunks (*Eutamias*)
32 fleas from	2	normal Beecheyi squirrels
14 fleas from	9	normal Golden mantled squirrels
29 fleas from	5	normal Beecheyi squirrels

Placer County—Infected area proved since 1936; 1 of 71 pools with 3,411 fleas collected from 3,537 rodents; 70 fleas from 107 normal chipmunks infected guinea pigs with plague.

San Bernardino County—No rodent plague demonstrated. Twelve of 76 pools including 4,808 fleas from 2,255 rodents infected guinea pigs.

44 fleas from	11	normal Beecheyi squirrels
78 fleas from	28	normal Beecheyi squirrels
52 fleas from	13	normal Beecheyi squirrels
78 fleas from	102	normal chipmunks
6 fleas from	7	normal Fisheri squirrels
260 fleas from	20	Golden mantled and 31 Fisheri squirrels
56 fleas from	27	Golden mantled squirrels
213 fleas from	33	normal Fisheri squirrels
194 fleas from	74	Golden mantled squirrels
521 fleas from	79	miscellaneous rodents
491 fleas from	43	Fisheri squirrels
30 fleas from	36	Golden mantled squirrels
12 fleas from	76	white-footed mice
5 fleas from	6	wood rats (Neotoma)

San Mateo County—During 1936, 18,729 fleas were collected from 802 rodents in 155 pools. Since it was impractical to make the necessary tests, the vials with the fleas in salt solution were stored in a refrigerator at 3° C. for 10 to 11 months. When the pools were tested in 1937, 6 were found to produce typical plague in guinea pigs. Careful field studies showed that the infected fleas had been collected from rodents present in burrows which harbored diseased rodents 20 years ago. Repeated search for infected squirrels during the past 5 years invariably resulted in negative findings. The persistence of clandestine foci of plague in close proximity to human habitation was an interesting discovery. Although the viability of *P. pertis* in stock cultures for many years is well known, the fact that the bacteria remained alive in the dead fleas soiled with a variety of microörganisms (*B. coli, B. proteus,* cocci,

etc.) held at ice box temperature is specially noteworthy.

Santa Cruz County—Twenty pools consisting of 5,345 fleas from 789 rodents yielded entirely negative results despite the fact that, in 1936, 7 of 35 pools consisting of 2,154 fleas proved to be infected.

(2) *Idaho*—Dr. C. R. Eskey demonstrated by guinea pig inoculations *P. pestis* from triturating 56 fleas and 1 louse from 7 *Citellus armatus* shot on June 17, 20 miles north of Lava Hot Springs, Bannock County.

(3) *Nevada*—In an extensive series Dr. C. R. Eskey has proved the existence of infected fleas in various counties of Nevada as follows:

10 fleas from 19 chipmunks (*Eutamias frater*) in Ormsby County

36 fleas from 52 chipmunks (*Eutamias frater*) in Ormsby County

95 fleas from 46 chipmunks (*Eutamias frater*) in Ormsby County

106 fleas from 55 chipmunks (*Eutamias frater*) in Douglas County

318 fleas from 200 chipmunks (*Eutamias frater*) in Douglas County

134 fleas and 4 lice from 3 Beecheyi squirrels in Ormsby County

(4) *Oregon*—Infected fleas were found by Dr. C. R. Eskey as follows:

56 fleas from 36 Oregon squirrels in Lake County

264 fleas from 56 Columbia squirrels in Wallowa County

(5) *Utah*—The fleas (25) collected from 2 healthy *Citellus grammurus* in Morgan County were found to be infected, while the insects removed from diseased squirrels in Wasatch County proved to be non-infected.

(6) *Washington*—Pools of fleas and lice collected from *Citellus townsendi* in Adams County proved to be infected.

Even a cursory analysis of the data on fleas demands a brief discussion. Although epidemiological and experimental data fully attest to the vital rôle of the flea in the propagation of plague both among the rodents and man, it is rarely appreciated that the vectors carrying *P. pestis* are not regularly capable of transmitting the parasite.

In 1915 Swellengrebel and Hoesen, while studying plague during inter-epidemic months, made the important discovery that in 18 instances the presence of plague was demonstrated by means of the inoculation of material from 15,279 triturated fleas taken from 3,230 rats. No human cases of plague were observed during the same time. More recently George and Webster (1934), in their inquiry into plague in the Cumbum Valley in South India call attention to the important difference between *infected* (pestiferous) and *infective* (pestigenous) fleas, and that the distinction has not been sufficiently emphasized. The mere sucking of blood carrying *P. pestis* by the flea does not necessarily render it infective, *i.e.*, likely to transmit infection. Even under the most favorable conditions, only an occasional infected flea becomes blocked and capable of infecting. Neither the total number of fleas found on the rodents, not even the number of infected fleas, but the number of infective fleas is of prime importance. The physiologic-pathologic processes, which lead to the blocking of fleas, are greatly influenced by the climatic factors. Thus during the hot season very few infected fleas become infective.

Doubtless similar observations have been made by Girard (1935) in Madagascar, who tried to explain the demonstration of infected fleas on healthy rats by assuming the presence of a bacteriophage either in the vector or in the rodent.

The problem concerning infected and infective fleas has primarily been studied in connection with the vectors found on rats. The pertinent question arises: Are the facts applicable to sylvatic plague? In order to answer it, one must search the extensive field and laboratory studies published by the Russian workers in articles not readily

accessible. One realizes that the evidence—in particular the vector efficiency—regarding the fleas is by no means as well worked out as that concerning their hosts. Each rodent has its own hordes of fleas and the rôle as vectors must be analyzed individually. The studies of Golov and Ioff (1925–1927) are in this connection quite important. These two Russian workers experimented in detail with the fleas (*Oropsylla silantiewi, Ceratophyllus tesquorum* and *Neopsylla setosa*) of the Siberian marmot (*Citellus pygmaeus*), and the pulicidae (*Ceratophyllus mokrzeckii* and *Ceratophyllus consimilis*) of the field mouse (*Mus musculus* and *Mus musculus* Wagneri). Although nearly all types of fleas were capable of transferring plague from rodent to rodent when used in large numbers, in one test as few as 3 insects infected the experimental animals. Less successful was Bytchov (1935) who fed 624 fleas collected from tarabagans, marmots, and rat-hares (*Ochotona daurica*) on different experimentally infected rodents. In 61 individual experiments using as many as 40 fleas, not one transmission succeeded. He emphasizes the fact that transfer of the plague virus will not take place until at least a partial blocking of the proventriculus and ventriculus of the flea has taken place. In fact, a wild rodent flea infects quite irregularly either immediately after sucking infected blood or later when massive growth of the plague bacilli leads to obstruction of the proventriculus. Already in 1928 Bytchov and Borzenov by using a cultural method in seeding the intestinal tube of dissected fleas on agar noted that normal insects with no signs of "blocking" of the stomach yielded positive cultures. Tumanski and Poliak investigated 1,797 fleas recovered from a marmot nest in November; 5 fleas yielded *P. pestis* although none was blocked. Based on these and similar observations, the Russian workers list the various modes of transmission of plague from rodent to rodent in the following order of importance:

1. Crushing of infected fleas with the teeth, infection through the mucosa of the buccal cavity with subsequent involvement of the lymph-nodes of the neck.

2. Scratching and rubbing of infected fleas, rarely fecal droppings into superficial skin wounds or abrasions.

3. Through the bite of the flea with a soiled proboscis following the sucking of blood from a diseased rodent.

4. Later as an infective-blocked insect.

Analyzing the epidemiology of sylvatic plague in its relation to man, the observers in Saratov and Trans-Baikal conclude that immediate contact with the sick or dead rodent leads to bubonic plague, while flea transmission is infrequent. The danger represented by individual fleas, therefore, appears more limited than was originally believed. Aside from serving as vectors, the wild rodent fleas act, according to the observations of Golov and Ioff, Tumanski and Poliak,[6] and Evseeva and Firsov [7] as "*preservers*" of plague infection in the burrows. Thus infected fleas obtaining an occasional meal may be alive for many months, particularly in regions where the moisture of the environment is high but the temperature low. Systematic studies concerning the influence of the "microclimate" and the burrows both on the preservation and in particular on the development of infective fleas from merely infected insects have not been made. Without a thorough understanding of the ecology of the species of fleas infecting the different rodents, it is impossible to evaluate the vector efficiency and the present-day risk of sylvatic plague to man. However, from the available information, it is

clearly demonstrated that the problem of infected versus infective flea applies also to the pulicidae of the wild rodents. In all probability, the vector efficiency plays an important rôle as has been pointed out by Eskey.

Experimental studies by Ioff and Pokrowskaja leave no doubt that the fleas of human habitations (*Pulex irritans, Ctenocephalus felis,* and *Ctenocephalus canis*) become readily infected, and may carry the bacteria in the intestinal tract for many days. They remain permanently infected until death but never become *infective.*

In considering the rôle of the infected flea, one important observation by Bytchov must not be overlooked. Eight guinea pigs used in the feeding experiments with plague infected fleas discussed in the preceding paragraphs, survived when again bitten by 10–40 plague fleas; 1 month later all 8 animals proved immune against a dose of *P. pestis* fatal to controls. These observations and those by the Indian Plague Research Commission on rats suggest to him the realization that also under natural conditions rodents bitten by infected fleas may not succumb but become actively immunized. This hypothesis deserves experimental investigation for the following reasons:

Although the flea with a stomach capacity of 0.5 cu. mm. of blood may ingest at least 5 bacilli from a rat with 10,000 plague bacilli per c.c. in the blood stream. No estimates concerning the number of bacilli which are regurgitated from a "blocked" flea are available. In fact, it is reasonable to surmise that the viscous consistency of the "block" may contribute a variable number of *P. pestis* to the inoculum. Of interest, in this connection, are the findings of Borzenov who bacterioscopically counted 70,112 and 1,026,921 plague bacilli, respectively, in 3 infected fleas. There is no standard method of testing virulence except the procedure by Sokhey on mice. At least 12 to 24 bacilli are required to cause an infection by the intraperitoneal route. Probably a considerably larger number is needed to infect by the cutaneous route and, furthermore, the infective dose may vary with the species of rodent (in some recent experiments on Richardson squirrels at least 250). Finally, the ability of the flea to become infected will depend on the number of plague bacilli in the blood stream of the sick or dying rodents. Nothing definite is known regarding this phase of the problem. Feeding of wild rodent fleas on plague infected guinea pigs may not imitate the conditions as they occur in the burrows.

The absence of infected fleas collected from squirrels dead with septicemic lesions of plague still requires an explanation. Preliminary observations indicate that the method of collecting the fleas with the aid of gaseous antiseptics may not be responsible for the discrepant findings, but other important, as yet unknown, factors affecting the host-parasite relationship in the rodent play a rôle.

Both the early reports and the more recent observations emphasize the fact that handling of sick and dead rodents, occasional bites and similar accidents preceded the appearance of bubonic or carbuncular human lesions. A perusal of the 55 American case histories dealing with plague infections of supposed squirrel origin fail to report fleabites in about 40. It will always remain a matter of conjecture as to the actual number of cases which were caused by fleabites, since the allergic cutaneous response of man to those insects is decidedly different. As a rule, the bite of wild rodent fleas (*Oropsylla, Hoplopsylla,* etc.) produces no reaction, while the insects of human habitations are responsible for the purpura pulicosa. Certain species of fleas may be

efficient vectors of *P. pestis* between wild rodents, yet they rarely attack man. A fact which is quite often overlooked.

SCIENTIFIC INVESTIGATIONS

1. *Vector Efficiency and Plague Transmission*—Dr. C. R. Eskey will report on his exceedingly important studies at the forthcoming meeting of the Western Branch of the American Public Health Association at Portland, Oregon.

2. *Rodent Studies*—Dr. Walter M. Dickie and E. T. Ross of the California State Department of Public Health approved and supported, during the summer of 1937, a research program by Dr. Tracy I. Storer on the native rodent population in the Tahoe area. Fletcher G. Palmer, M.S. (Mammology), was engaged to conduct the studies on rodents. As might be anticipated, a 6 months program of study merely paves the way for further work. The technics which had to be developed, in particular with respect to the trapping operations, required a great deal of time and ingenuity, and it is obviously necessary to continue the investigations for a number of years and not merely as seasonal studies. The results may be summarized as follows:

a. The rodent population in a plague area in the California mountains is quite large, and varies from 27 to 117 individuals per acre. Depletion of the rodent populations by trapping small areas is followed within 2 months by recovery to a considerable fraction of the original numbers.

b. Rodent control over a narrow belt is soon followed by re-invasion from adjacent non-poisoned areas.

c. Experimental selection of most preferred baits may lead to more effective operations.

d. The most abundant and most catholic rodents, in respect to habitat, are commonest in human habitations.

e. Capture, marking, and defleaing of wild rodents is thoroughly practicable. Limited use of this technic resulted in recapture of a number of chipmunks and squirrels from which fleas, acquired by the rodents after first release, were removed. ***Thus, for the first time it is believed, data were obtained on the rate at which rodents re-acquire ectoparasites within short intervals after being defaunated.***

f. These results show that fleas are present in rodent territory in addition to those actually on the rodents. It is not unlikely that the temporary reduction of rodent hosts (through control measures) may expose human beings to greater chance of becoming host to fleas, particularly where rodent burrows and nests are in close proximity to human habitations.

g. Live trapping operations show that larger numbers of fleas are obtained by defaunating rodents captured in live traps than from rodents killed in snap traps.

3. *Entomological Studies*—As a part of the research program on the rodent population, Dr. M. A. Stewart with the assistance of Frank Tatum conducted a number of preliminary entomological studies, summarized as follows:

a. During the season, the 3,137 fleas collected from 2,032 rodents may be roughly classified into 14 genera and 21 species. The identifications are not as yet completed.

b. The incidence of flea infestation is quite variable and apparently not determined by host size.

c. A seasonal incidence in flea infestation has been observed. Shrews (*Sorex vagrans amoenus*) become more heavily infected as the season progresses; the Beecheyi squirrels show a marked increase in the magnitude of flea infestation beginning in August and still increasing in October. The flea indices on chipmunks (*Eutamias*) indicate a rise in July with a peak in

the second week in August. The Sierra Nevada chickaree differs from all other hosts in that its flea index is higher from the second week in June to the last few days in July, than during the remainder of the season during which the investigations were conducted.

d. There are indications of regional differences in flea populations of different hosts in different areas of the territory investigated.

e. A more or less constant flea population level is maintained on a rodent over a period of time, not great enough to involve factors capable of exerting an influence upon the bionomics of the fleas sufficient to bring about a change in the size of the general population. *It is quite obvious that a rodent, which has been freed of all fleas, will acquire what appears to be the normal number for that particular season of the year in a very short time, possibly within a few hours.* It is equally demonstrated that these fleas in question are active in seeking hosts. This information is very pertinent to the execution of sylvatic plague control procedures. *If rodents move into a focus of plague after rodent control measures are effected and before the fleas have died from starvation, which may require a very considerable period of time, they may be readily attacked by infective fleas and thereby maintain the focus of infection.*

f. The preliminary observations indicate that the flea indices of rodents surviving the control operations are *not significantly different* from those collected from rodents taken in non-poisoned areas. Furthermore, taking into consideration the seasonal incidence of flea populations, there seems to be no increase in flea indices manifested after some time has elapsed following the distribution of poison.

g. Experimental studies have shown that methylbromide, administered at the rate of 10 c.c. per burrow opening, is very efficient in controlling both burrow rodents and their fleas. This fumigant, of course, must be used with the customary care accorded to all highly toxic gases.

NOTE: The Chairman of the Committee begs to express to the Executive Committee, the Health Officers, Dr. C. R. Eskey, and the U. S. Public Health Service his appreciation for the continuous assistance he was privileged to receive during the collection of data presented in the report. The liberal support given by Dr. W. M. Dickie and the State Department of Public Health has greatly broadened the knowledge in a very complex field of epidemiology; it has enabled both Dr. Tracy I. Storer and Dr. M. A. Stewart to collect information along the lines in which they are experts.

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Preventive Medicine

THE object of preventive medicine is to prevent not only the spread of disease, but its unnecessary occurrence, to remove its occasion, to save the time which it loses, and the suffering which it causes.—Sir George Newman.

Contributions of Edward Jenner to Modern Concepts of Heart Disease

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WHEN the name of a versatile person becomes associated with an outstanding achievement, posterity often fails to give due recognition to his other gifts and accomplishments. Edward Jenner is ranked among the immortal figures in medicine because he first successfully introduced preventive inoculation as we know it today. Because his name is associated with the discovery of vaccination against smallpox we are apt to lose sight of some of his other contributions to medicine.

Had Edward Jenner never observed the vicarious relationship of cowpox to smallpox he would still have been remembered among the great clinicians of his day—the Hunters, the Pitcairns, Parry, Heberden, Rush, and others. Not only was he a distinguished physician but he also made botanical and ornithological observations, played on the violin and flute, and wrote occasional poems.[1] John Hunter, his tutor and friend, a naturalist of no mean ability, although generally remembered for lifting surgery above the plane of the barber surgeons, attempted to induce him first to become a biologist and later a teacher of medicine. On Hunter's recommendation Jenner was appointed to prepare and examine specimens which Captain Cook brought back from the South Seas, and was subsequently offered the position of naturalist to one of these expeditions.[2]

When Jenner, while a general practitioner in Berkeley in 1771, overheard a young woman remark "I cannot have that disease, I have had cowpox," he began considering the possibility of conferring an artificial immunity against smallpox and went to John Hunter for advice. Hunter more than atoned for his previous suggestions by counselling him[2]: "Don't think, try; be patient, be accurate."[3]

RELATION OF CORONARY ARTERY DISEASE TO ANGINA PECTORIS

In 1768 Heberden described the symptom complex which he called "angina pectoris."[4] His ideas concerning the nature or cause of this syndrome were quite hazy. In May, 1777, John Hunter in a letter to Jenner briefly mentioned symptoms of a cardiovascular disease, from which he had suffered since 1773. In August he went to Bath for treatment. Here Jenner saw him and concluded that Hunter was suffering from angina pectoris. So greatly concerned was he that he wrote to Heberden in 1778 about

* From the Office of Heart Disease Investigations, National Institute of Health, U. S. Public Health Service. Branch Office: 133 So. 36th Street, Philadelphia, Pa. Published by permission of the Surgeon General.

their common friend's condition. In this letter he mentioned two dissections on subjects who had died of angina pectoris in which the chief morbid findings were thickening of the coronary arteries. Heberden had failed to note this, only finding sclerotic plaques in the aorta. Jenner discussed the difficulties of dissecting these vessels due to their often being embedded in fatty tissues. He states:

> The importance of the coronary arteries and how much the heart must suffer from their not being able to perform their functions (we cannot be surprised at the painful spasms) is a subject which I need not enlarge upon, therefore shall only remark that it is possible that all of the symptoms may arise from this one circumstance. Should it be admitted that this is the cause of the disease I fear the medical world may seek in vain for a remedy.[1]

John Fothergill, in 1776,[5] had described coronary sclerosis in a patient who had died of angina pectoris in 1775. He did not definitely associate the condition of the coronary arteries which "from their origin to many of their ramifications were become as one piece of bone" with the clinical manifestations. Caleb Hillier Parry, who in 1799 wrote a very clear account of the relationship of angina pectoris to coronary disease, conceded the priority of this conception to Edward Jenner.[6] In the introduction Parry includes a letter from Jenner, illustrative of a subtle sense of humor as well as confidence in his views concerning the underlying cause of angina pectoris. It reads in part:

> The first case I ever saw of Angina Pectoris, was that in the year 1772, published by Dr. William Heberden, with Mr. Hunter's dissection. There, I can almost positively say, the coronary arteries of the heart were not examined. Another case of a Mr. Carter, at Dursley, fell under my care. In that, after having examined the most remote parts of the heart, without finding any means for which I could account for his sudden death, or the symptoms preceding it, I was making a transverse section of the heart pretty near its base when my knife struck against something hard and gritty, as to notch it. I well remember looking up at the ceiling, which was old and crumbling, conceiving that some plaster had fallen down. But on a further scrutiny the real cause appeared: The coronary arteries were become bony canals. Then I began a little to suspect. Soon afterward Mr. Paytherus met with a case. Previously to our examination of the body, I offered him a wager that we would find the coronary arteries ossified. This however proved not to be exactly true; but the coats of the arteries were hard, and a sort of cartilagenous canal was formed within the cavity of each artery, and there attached, so however to be separable as easily as the finger from a tight glove. We then concluded that malorganization was the cause of the disease. . . . The appearance in Mr. Bellamy's case gave me the idea that the disease arose from a determination of the vasa vasorum, and that the concretions were deposits from the coagulable lymph or other fluids, which had oozed on the internal surface of the artery.

The last two cases strongly suggest previous acute thrombotic coronary occlusion, in the first of which there was evidently a re-canalization of the artery.

Due to the fear of the effect it might have on his friend Hunter, Jenner did not further pursue his studies or publish these observations. They were subsequently confirmed by a postmortem examination on Hunter who died suddenly while arguing with colleagues at a hospital board meeting in 1793, some 15 years later. A necropsy was performed by Sir Everard Home, who wrote Jenner:

> I am assured that you were sincerely afflicted at the death of your old and most valuable friend; whose death, although we all looked for it was more sudden than could have been imagined. It is singular that the circumstance you mentioned to me and you were always afraid to touch upon with Mr. Hunter should have been a particular part of his complaint, as the coronary arteries of the heart were considerably ossified.[7]

Among the other findings of interest in this necropsy were two white plaques, on the under surface of the

left auricle and ventricle, entirely distinct in color from the rest of the heart. These could well have been the results of former myocardial infarctions, possibly occurring at the outset of symptoms a score of years previously. The mitral valves and the aortic valves were extremely thickened, and in places ossified—probably the result of sclerotic processes, although suggestive of an old rheumatic infection. The aorta was dilated, giving the appearance of an incipient aneurysm. The internal membrane of the aorta was studded with opaque white spots raised higher than the general surface.[8] These findings are consistent with those of syphilitic aortitis, and are consonant with the view that Hunter had syphilis, said to have been acquired during one of the operations on aneurysms, for which he was noted, or during some of the self-inoculation experiments with material from persons infected with venereal diseases. The changes in the coronary arteries were apparently of sclerotic origin, since these vessels were "hard as bony tubes." Changes in the coronary arteries due to syphilis do not usually extend more than one to two centimeters from the orifices.

Jenner's views form the basis for the present-day concept of angina pectoris. The current teaching is that this condition is due to a relative myocardial ischemia occurring as a result of acute coronary arterial insufficiency. The mechanism of these attacks is still imperfectly understood. Nervous influences play an important rôle. In at least 75 per cent of cases, significant changes are found in the coronary arteries. Coronary arteriosclerosis is by far the most common lesion, although atresia of the orifices of these vessels as a result of extension of syphilitic aortitis, rheumatic coronary arteritis, emboli from various causes, and other less frequent factors are sometimes responsible. Angina pectoris has been known to occur as a result of anemia, and cease when the anemia has been overcome. The opinion Jenner expressed concerning the progressive nature of the underlying changes was prognostically prophetic, for medical science still waits methods for preventing coronary artery disease or satisfactorily postponing its more serious consequences.

RHEUMATIC HEART DISEASE

About 1778, Jenner was instrumental in forming a society which had for its objective improvement in medical science. It was also intended to promote conviviality and good fellowship. This small medical society usually met in the Fleece Inn at Rodborough. Jenner was a member until about 1790. It was during these meetings that he presented a paper on angina pectoris, which later formed the basis of his friend Parry's book on that subject.[1]

Edward Jenner was among the first to note the relationship between rheumatic fever and heart disease. According to the records of this society, on July 29, 1789:

"Mr. Edward Jenner favored the Society with remarks on a disease of the heart following Acute Rheumatism illustrated by Dissections." This paper, together with the one on angina pectoris and others, fell into the hands of some of its members and he could never recover them. Baron, one of his earliest biographers, states:

> I have heard him lament the loss of one of them in particular. It contained observations concerning the diseases of the heart, which frequently come on during attacks of acute rheumatism, and lead to enlargement and disorganization of the part. This formidable disorder had very much escaped the notice of medical men. Jenner's observations were original and had they been published at the time they were first communicated to the Society, his claim to priority could not have been set aside as it has been since that time by other writers.

On January 10, 1805, evidently wishing to establish claim to the originality of this observation, he wrote to Dr. Caleb Hillier Parry:

> A neighbor of mine died yesterday, from a disease of the heart which followed two or three attacks of acute rheumatism. You may probably remember a paper of mine that was given at the Fleece Medical Society on this subject. This and my other papers are in your possession. If you could be good enough to convey them to me I should be extremely happy in regaining them particularly that I now allude to, as I am confident that many a life is lost by not shielding the heart at the going off of acute rheumatism. . . .

As there is no record of the return of this manuscript it seems evident that it was lost.

The claim for Jenner's priority in noting the relationship between rheumatic fever and heart disease is not as clear as that of the coronary basis of angina pectoris. According to Hope,[10] David Pitcairn in 1788 taught that persons subject to rheumatism were attacked more frequently than others with an organic disease of the heart which he called rheumatism of the heart. Mathew Baillie [11] in a footnote in his second edition of *Morbid Anatomy of Some of the Most Important Parts of the Human Body*, published in 1797, gives Pitcairn credit for discovering the relationship between acute rheumatism and heart disease. In a later edition he states [12]:

> Dr. Pitcairn observed this in several cases and should be considered as the first person who made this important observation. Its accuracy has since been confirmed by different individuals of high professional character, so that it may now be regarded as an established pathological fact.

These editions were dedicated to Pitcairn. In the first edition, published in 1793 and dedicated to Sir George Baker, no mention is made of this relationship.

Pitcairn, who incidentally was the son of Major John Pitcairn, who was killed leading the British forces at the Battle of Bunker Hill, never published these observations. In at least one obituary notice he was given credit for being the first to associate acute rheumatism with heart disease. One states that he was the first to note the connection between rheumatism of the external parts and certain affections of the heart which he communicated to Dr. Baillie who wrote concerning it.[13] Pitcairn was by nature a very shy person and once stated that the reason he never wrote was because he did not wish "to contradict seven years hence" his present opinion. One obituary writer commented concerning him "Such rigid abstinence from anything like authorship is not to be defended, particularly among the higher orders of physicians, because it may be extended to the rejection of every project for the improvement of their art." [14]

Although Baillie mentions acute rheumatism as a cause of morbid changes in the heart, it remained for Dundas, in about 1806, first to describe clinical cases of acute rheumatism with cardiac manifestations, proved later by postmortem examinations. These observations were published in 1812.[15] He stated that as early as 1770 he had noted this relationship. Of the 9 cases he reported, 7 were dead and the 2 surviving cases offered poor prognoses. All of his patients were young individuals, only 2 over 22 years. In all the cases he had seen the disease followed one or more attacks of rheumatic fever. In 1 case the affection of the heart had appeared at the commencement of the acute rheumatism. Usually it attended a migrating polyarthritis and ran a course of a few months, ending in dropsy. In his description of the morbid anatomy, pericarditis and cardiac enlargement seemed to be the most prominent features, although in 1 case involvement of the mitral valve was inferred.

Irrespective of whether Edward Jenner was the first to note the relationship between acute rheumatism and heart disease, there is little doubt that he was among the first to conceive it. Jenner's and Pitcairn's observations were made independently. Jenner was at that time residing in Berkeley.[16] Pitcairn lived in London. There is no evidence that they were then acquainted. Pitcairn was John Hunter's physician, and later they belonged to the same medical society in London. Although the manuscript was lost, there seems little question that Jenner was the first to write upon this subject. Since he supported his observations with necropsy specimens, which probably took some time to collect, it is not unreasonable to believe that he was the first to offer objective proof of the nature of rheumatic heart disease.

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Survey of Belgian Health Services

IN coöperation with the Belgian Ministry of Health, the Health Committee of the League of Nations will make a survey of health conditions of the population and of the equipment, organization, methods and efficiency of the health services in Belgium.

Professor Parisot, of Paris, is chairman of the committee appointed to make the study early this summer.

Alum Precipitated Toxoid for the Prevention of Diphtheria

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THIS favorable field experience with one dose alum precipitated toxoid for the prevention of diphtheria is presented in view of the fact that the immunizing value of one injection of the product has been questioned. It is obviously desirable to produce immunity by one treatment, if possible.

In 1931, Glenny and Barr [1] described the complete precipitation of diphtheria toxoid by alum to produce a slowly absorbable antigen. In 1932, Wells, Graham, and Havens reported very favorable indications of immunity in guinea pigs and in children from the single injection of such an antigen.[2] Since August, 1935, alum precipitated toxoid has been widely distributed in upstate New York by means of the State Department of Health laboratory supply stations.

Seven months prior to such distribution an opportunity was presented for a trial of the product in Chautauqua County in the southwestern part of New York State. The Buffalo district staff of the State Department of Health assisted local health officials in the control of an epidemic of 17 cases of diphtheria with 3 deaths in rural Chautauqua County in December, 1934, and January, 1935. Twelve of the cases and all of the deaths occurred in 1935.

Chautauqua County, with an area of 1,069 square miles, had in 1930, 127,745 people, of whom 63,500, or 50 per cent, lived outside the two cities. The county, exclusive of the cities, has been relatively free from diphtheria. During the 10 year period 1925 to 1934, inclusive, the cases of diphtheria per 100,000 population in upstate New York urban areas of 2,500 population and over; rural areas of less than 2,500 population; and Chautauqua County, outside the cities were 40.3, 23.1, and 12.3, respectively. For the same period of time the death rates per 100,000 population for the above named areas were 3.1, 2.0, and 1.1, respectively. Following the epidemic, the rates in Chautauqua County, exclusive of the cities, again became relatively low. In the county outside the cities in 1935 there were 4 cases of diphtheria in addition to the 12 in the epidemic; in 1936 there was no case, and in 1937 there was 1 case, with no deaths. During 1936 and 1937 the cases per 100,000 population in upstate New York urban areas, rural areas, and Chautauqua County, exclusive of the cities, were 4.1, 4.4, and 1.5, respectively. The corresponding death rates were 0.4, 0.5, and 0. None of the Chautauqua County diphtheria occurred among persons who had received alum precipitated toxoid.

The diphtheria immunization status of rural Chautauqua County is indicated in part by the fact that a total of 1,316 or 28 per cent of the estimated population under 5 years of age, in the county outside the two cities on January 1, 1935, was officially reported to have had two doses of unmodified toxoid or three of toxin-antitoxin.

The intracutaneous test of susceptibility to diphtheria toxin was given in January and February, 1935, to 1,552 persons, with age recorded, in the epidemic area to determine whether or not they needed immunization. The Schick material which was used for the test in the left forearm and for the control of heated toxin in the right forearm was produced by the Division of Laboratories and Research of the New York State Department of Health. The arms were read after an interval of from 5 to 7 days. The age distribution of the 1,552 persons was as follows: under 5 years, 21 per cent; 5 to 14 years, 68 per cent; and 15 years and over, 11 per cent. Ninety-nine per cent of the children under 5 years of age; 70 per cent of those age 5 to 14 years; and 1 per cent of the persons age 15 years and over, who were Schick tested, had previously received unmodified toxoid or toxin-antitoxin.

Thirty-seven per cent of the 466 individuals tested who had never received toxoid or toxin-antitoxin were Schick negative, as were 85 per cent of 296 who had obtained two injections of unmodified toxoid 1 to 4 years previously, and 87 per cent of 790 who had received three treatments with toxin-antitoxin 1 to 10 years earlier.

Alum precipitated toxoid prepared by the Division of Laboratories and Research of the New York State Department of Health and meeting the standards of the National Institute of Health, was administered to 620 persons, of whom 442 were Schick positive and 178 had not been Schick tested. One dose of 1 c.c. of the material was injected subcutaneously on the outer side of each left upper arm. A nodule remained in the arm usually for weeks, but no undue reactions or abscesses were reported.

At 4, 16, and 28 months after the administration of the toxoid, Schick tests were given to as many as possible of the 620 persons who received the product. The procedure was the same as described for the preliminary intracutaneous test of susceptibility to diphtheria toxin. There were 401 individuals Schick tested at 4 months, 385 at 16 months, and 246 at 28 months. The dispersion of the population throughout 7 townships made repeated assemblage difficult. The persons who were Schick tested are considered to be random samples of the original 620 given precipitated toxoid, as each time all who could be induced to appear were tested.

It is probable that the small quantity of diphtheria toxin in the Schick material produced some immunizing effect. Among the 620 persons given alum precipitated toxoid there were 92 who received a total of four Schick tests, 211 who had three, 189 who had two, 95 who obtained one test, and 33 who had none. The 95 persons who had only one Schick test and the 33 who had none were the persons who failed to return for testing after they had had the precipitated toxoid.

Among 159 individuals who were Schick negative 4 months after having received 1 c.c. of alum precipitated toxoid, 152, or 96 per cent, remained negative 28 months after they obtained the toxoid. The percentage is nearly as high—94 per cent—among 69 persons who were known to be Schick positive prior to the receipt of the precipitated toxoid, and to have had no prior toxoid or toxin-antitoxin. Among 7 individuals Schick *positive* 4 months

Intracutaneous Tests of Susceptibility to Diphtheria for 620 Persons Each of Whom Received One Injection of 1 c.c. of Alum Precipitated Toxoid in January or February, 1935

TABLE I

Result of Schick Test at Intervals of 4, 16, and 28 Months After Administration of 1 c.c. of Alum Precipitated Toxoid to 302 Schick Positive Individuals Who Had Not Previously Received Toxoid or Toxin-antitoxin

Age in Years When Treated	Number Treated	Schick Test Subsequent to Administration of Alum Precipitated Toxoid								
		4 Months			16 Months			28 Months		
		Number Tested	Negative		Number Tested	Negative		Number Tested	Negative	
			No.	Per cent		No.	Per cent		No.	Per cent
0–4	17	14	12	86	10	9	90	10	10	100
5–9	94	59	55	93	61	57	93	48	45	94
Under 10	111	73	67	92	71	66	93	58	55	95
10–14	87	64	57	89	61	56	92	35	32	91
15+	94	62	47	76	52	37	71	17	11	65
Unknown	10	5	4	80	3	3	100	0	0	0
Total	302	204	175	86±1.6*	187	162	87±1.6*	110	98	89±2.0*

* = Probable error of the percentage

after receipt of 1 c.c. of alum precipitated toxoid, 5 were Schick negative 28 months after the injection of the toxoid. The group of 7 Schick positive at 4 months included 5 who were known to be Schick positive prior to injection of the precipitated toxoid and to have had no toxoid or toxin-antitoxin previously. Three of the latter 5 had negative Schick reactions 28 months after injection of the antigen.

The results of the intracutaneous tests of susceptibility to diphtheria for 620 persons each of whom received one dose of alum precipitated toxoid are presented in 3 tables. Table I deals with the most significant group, namely, the 302 persons who were Schick positive before obtaining 1 c.c. of precipitated toxoid and had had no prior toxoid or toxin-antitoxin. At the end of 4 months from the receipt of the toxoid 175, or 86 per cent, of 204 of the individuals tested were Schick

TABLE II

Result of Schick Test at Intervals of 4, 16, and 28 Months After Administration of 1 c.c. of Alum Precipitated Toxoid to 140 Schick Positive Individuals Who Had Been Treated Previously, but Unsuccessfully, with Unmodified Toxoid or Toxin-antitoxin

Age in Years When Treated	Number Treated	Schick Test Subsequent to Administration of Alum Precipitated Toxoid								
		4 Months			16 Months			28 Months		
		Number Tested	Negative		Number Tested	Negative		Number Tested	Negative	
			No.	Per cent		No.	Per cent		No.	Per cent
0–4	1	0	0	0	0	0	0	0	0	0
5–9	30	16	13	81	18	16	89	14	14	100
Under 10	31	16	13	81	18	16	89	14	14	100
10–14	63	45	44	98	51	47	92	33	32	97
15+	41	32	30	94	18	16	89	11	11	100
Unknown	5	3	3	100	2	1	50	0	0	0
Total	140	96	90	94±1.6*	89	80	90±2.1*	58	57	98±1.2*

* = Probable error of the percentage

negative; at the end of 16 months, 162, or 87 per cent, of 187 persons were Schick negative; and at the end of 28 months, 98, or 89 per cent, of 110 individuals were Schick negative. The results for the persons under 10 years of age were even more favorable, being 92 per cent of 73 persons at the end of 4 months, 93 per cent of 71 at the end of 16 months, and 95 per cent of 58 at the end of 28 months. The increasing immunity with time may be due partly to the late effects of the alum precipitated toxoid, to Schick test toxin, or to naturally acquired immunity.

Table II shows the effect of the alum precipitated toxoid which was given to 140 Schick positive persons who had been treated previously, but unsuccessfully, with unmodified toxoid or with toxin-antitoxin. For all ages, the percentages Schick negative at the end of 4 months, 16 months and 28 months after the use of the precipitated toxoid were 94, 90, and 98. The higher Schick negative percentages in Group II than in Group I may be due to the generally readier response to antigen of persons who have had previous antigenic stimulation than those who have not.

Table III indicates the result of the administration of alum precipitated toxoid to 178 individuals who had not previously been Schick tested and had not formerly received toxoid or toxin-antitoxin. For all ages, the percentages Schick negative 4 months, 16 months, and 28 months subsequent to receipt of the precipitated toxoid were 98, 98, and 95. It was anticipated that these percentages would be higher than those for Group I because many of the Group III individuals would doubtless have been found negative if they had been Schick tested before being given the precipitated toxoid. As stated previously, 37 per cent of 466 persons in the epidemic area who had never had toxoid or toxin-antitoxin were found Schick negative. If 37 per cent of the Group III individuals who were Schick tested at 4, 16, and 28 months were already negative before they received the toxoid, the percentages made negative by treatment would be 97, 97, and 92.

CONCLUSION

It has been demonstrated that even in an area where diphtheria is not endemic a single dose of 1 c.c. of alum precipitated toxoid will give immunity

TABLE III

Result of Schick Test at Intervals of 4, 16, and 28 Months After Administration of 1 c.c. of Alum Precipitated Toxoid to 178 Individuals Who Had Not Been Previously Schick Tested and Had Not Formerly Received Toxoid or Toxin-antitoxin

Age in Years When Treated	Number Treated	Schick Test Subsequent to Administration of Alum Precipitated Toxoid								
		4 Months			16 Months			28 Months		
		Number Tested	Negative		Number Tested	Negative		Number Tested	Negative	
			No.	Per cent		No.	Per cent		No.	Per cent
0-4	89	50	50	100	59	57	97	38	37	97
5-9	59	40	39	98	40	40	100	32	31	97
Under 10	148	90	89	99	99	97	98	70	68	97
10-14	25	9	9	100	9	9	100	8	6	75
15+	5	2	1	50	1	1	100	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0
Total	178	101	99	98±0.9*	109	107	98±0.9*	78	74	95±1.6*

* = Probable error of the percentage

to diphtheria, as determined by the Schick test, to approximately 89 per cent of persons for at least 28 months following injection. From the public health point of view the continued use of one dose alum precipitated toxoid seems justifiable.

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Public Health Courses in Texas

A COURSE in public health has been offered during the past summer at the Texas Technological College at Lubbock, sponsored jointly by the Texas State Department of Health, the Industrial Division of the State Department of Education, and the College. The course is designed for the training of public health workers and sanitation officers. Successful completion of the course and subsequent examinations lead to a certificate of completion which will be recognized by the Texas State Department of Health. Courses have included Bacteriology, and its relation to Public Health, Dairy and Milk Inspection, Elementary Studies in Water Supplies and in Sewage Disposal, Elementary Surveying, Mechanical Drawing, Control of Swimming Pools, and Public Speaking, and are given by the regular members of the college faculty, supplemented by lecture courses from visiting specialists. These supplemental lectures have included the Organization of Health Departments and Health Units, Personnel Qualifications, Housing and Slum Clearance, Dental Hygiene, Illumination, Industrial Hygiene, Rodent and Insect Control, Epidemiology, Vital Statistics, Food and Drug Inspection, Tourist Camp and Rural Sanitation. A total of 28 persons attended the school during the first sessions, with 16 completing the course. These individuals come from 21 counties distributed throughout the state. The members of the first class have formed the Texas Association of Trained Sanitarians.

Present Status of Safety Education in Some Representative School Systems

JOHN P. SULLIVAN, PH.D., F.A.P.H.A.

Supervisor of Health and Safety, Public Schools, Boston, Mass.

THE primary purpose of a questionnaire which we sent out was to lay the groundwork for a research study which would enable us to secure better guides for the formulation of a program of safety education for Boston. Through the medium of this questionnaire we endeavored to ascertain the status of safety education programs in other cities. In analyzing the returns particular attention was given to organization, supervision, policies, and procedures. From the data so gathered we attempted a comparison of safety education in these cities with the program existing in Boston. The aim was to bring out any omissions in our own safety program. The study further intended to embody the best in policies and organization from other cities, and to determine the extent to which certain experimental procedures were used.

PROCEDURE

In order that the questionnaire might be adequate for the purpose for which it was intended, it was submitted to a superintendent, a director of educational research, a supervisor of safety education, a headmaster, and a classroom teacher for their approval. Their suggestions were incorporated into the following form which was adopted.

This form was sent to 100 representative school systems scattered through the country with a conscious consideration of large and small city school systems of reputed progress in education. Despite the fact that this questionnaire required detailed information from the recipients it was favorably received and the authorities of 75 of those 100 school systems approached gave information which was complete enough to be of value.

Since the average school superintendent has been literally bombarded with blanks, forms, and questionnaires in the past 15 years it was felt that this generous response indicated a definite interest, if not enthusiasm, concerning this newer movement of safety education.

In order to consider the replies to the questionnaire on a geographic basis, the country was divided into 4 sections. Here it was found that 29 per cent of the replies came from school systems in the South; 17 per cent from the West; 28 per cent from the Northeast, while 26 per cent were from the North Central section. These replies furnished an excellent cross-section of American school systems.

In order to facilitate classifications, the data compiled from the replies were grouped in the following order: Organization, Supervision, Policies and Procedures. Under organization fell questions 1, 3, 4, 10, 11, 12, 13, 18; under supervision question 2; under policies were included questions 5, 14,

THE SCHOOL COMMITTEE OF THE CITY OF BOSTON, ADMINISTRATION BUILDING, 15 BEACON STREET

OFFICE OF THE SUPERINTENDENT

To the Superintendent of Public Schools:

The Boston School Department is very much interested in Safety Education. We ask your coöperation in giving us the following information in regard to your school system by checking the items listed.

Name of City ..... State .....

Name of Person Replying .....

Position of Person Replying .....

(Check)	Yes	No
1. Have you a course of study in Safety instruction?	....	....
2. Have you a person assigned to supervise Safety?	....	....
3. Is Safety instruction given a definite time allotment in the school curriculum?	....	....
4. Is Safety instruction given as part of Health instruction?	....	....
5. Is Safety Education compulsory?	....	....
(a) State Law:	....	....
(b) Local School regulation:	....	....
6. Do you have police assigned for school Safety work?	....	....
(a) Full time:	....	....
(b) Part time:	....	....
7. Do you have accident data distributed to teachers?	....	....
(a) By appointed School Official:	....	....
(b) By Police Department:	....	....
(c) By Private Agency:	....	....
8. Do you have Auto Clubs in Senior High Schools	....	....
9. Do you have student Safety Councils or clubs?	....	....
10. Do you have Safety Patrols?	....	....
(a) Elementary:	....	....
(b) Junior High:	....	....
(c) Senior High:	....	....
11. Do Safety Patrols direct vehicular traffic?	....	....
(a) In Street:	....	....
(b) From Curbing:	....	....
12. Do you have Safety Patrols supervised?	....	....
(a) Local Police Department:	....	....
(b) Local School Department:	....	....
(c) Private Agency:	....	....
13. Do Safety Patrols wear some insignia–	....	....
14. Do you permit commercial Safety material to be used in the classroom?	....	....
(a) Teachers' use:	....	....
(b) Pupils' use:	....	....
15. Do you have Police protection at dismissal times?	....	....
(a) Elementary Schools:	....	....
(b) Junior High Schools:	....	....
(c) Senior High Schools:	....	....
16. Do pupils receive instruction in all schools regarding: (a) Crossing streets at intersections:	....	....
(b) Playing in the streets:	....	....
(c) Traffic regulations and signals?	....	....
17. Are the primary children cautioned about Safety before each dismissal?	....	....
18. Do you have a system of collecting and investigating reports of school accidents?	....	....

Any additional information that you may be able to give us regarding Safety Education such as, monographs, bulletins, reports, types of visual material and courses of study will be greatly appreciated, and any suggestions growing out of your experience will be welcomed.

In requesting this information we realize the encroachment on your time and courtesy, and we shall be very glad to forward the completed study.

Very truly yours,
JOHN P. SULLIVAN
Supervisor of Health & Safety

16, 17; while under procedures were treated the remainder, 6, 7, 8, 9, and 15.

ORGANIZATION PROBLEMS

The problem of organizing safety education varied, but there were strong indications that the importance of this problem was recognized and that attempts were being made to meet it.

Course of Study in Safety Instructions—In compiling the replies received from the 75 cities in answer to the ques-

tion "Have you a Course of Study? it was found that 89 per cent of the school systems had either an individual safety education course of study or one which was an integral part of their health education program. It was further found that 51 per cent had a unified independent safety education course.

These figures indicate the growing recognition of the place of safety in the curriculum; yet there seems to be a fairly large percentage whose safety courses are of a tentative nature, suggesting that this phase of education needs more consideration in some sections. From the data submitted and from a further study it would appear that the elementary safety courses for grades 1 to 6 are well advanced; that those for the junior high school (grades 7 to 9) are in the developing stage; and that very little has been done in the senior high school field.

If the final test of learning is the emergence of appropriate conduct, then the teacher of upper as well as lower grades should have some outlines of the general attitudes, the finer appreciations, the important concepts and meanings, which they wish to secure as part of the results of the safety program.

Not until such time as there is a course of study scientifically constructed for all grades can we expect a unified, graded, and progressive plan of instruction and training in safety. School administrators must face the fact that if they give guidance to teachers in all phases of the curriculum except safety, it will undoubtedly occupy a correspondingly minor position in the minds of the pupils as well as the teaching force. Teachers are entitled to as much guidance in safety teaching as in the teaching of other subjects. If safety teaching and training are among the objectives of education, then the course of study is an important vehicle.

Time Allotment—In studying the problem of time allotment for safety education the widest diversity was noticed—only 36 per cent of the cities answering recording a definite time allotment for the study of safety.

From the additional information sent by many cities it may be said that the majority of school systems in the country are at present combining the study of safety with other subjects in the program. However, many are now planning a course of study with the intention of including it in the curriculum with a definite time allotment. This is an interesting highlight in view of the statement often heard that no more time can be given for new work. It shows definitely that school administrators have given and are giving this new movement careful consideration and feel that it is worthy of a definite time allotment in the development of their curriculum.

Safety, a Part of Health—That safety is an important factor in the conservation of child life cannot be denied. Reputable tabulations have statistically proved that accidents are responsible for more deaths than any single disease of childhood and, limiting ourselves to children of school age, *i.e.*, 5 to 15 years of age, accidents are responsible for 1 out of every 5 deaths. Quoting from Dr. Herbert Stack, we find our justification for those cities which have made safety a part of their health or physical education program:

> No one will question the fact that safety education has an important place in the school curriculum today. Educators generally agree that health and safety are basic objectives in the elementary and secondary schools; for of what avail is it to have a youngster learn the fundamental truths and the subjects of the school if he loses his health or even his life, or is seriously injured in childhood?

In view of the above quoted statement, we find that the cities answering from the various geographical divisions must have adopted this attitude. In

stating that these cities combine safety education with either health or physical education, we do not intend to convey the impression that the treatment of this subject is stereotyped to any degree; rather, it seems as if the presentation of the subject varies with the cities and their teaching staff.

Reports on School Accidents—We found that the collection and investigation of reports on school accidents has become a highly systematized part of the safety program in 60 per cent of the cities. Although this procedure was mentioned in two-thirds of the cities answering, it is doubtful whether any 5 cities returning answers go about the cataloguing of the returns in the same manner.

It was interesting to note that those cities which listed a collecting and investigating accident unit as an integral part of their safety program were among the largest cities in the country.

Safety Patrols—The safety patrol is the most universal phase of the safety program carried on in the school systems of the country. In compiling the returns it was found that of the 75 cities contacted, 89 per cent were affirmative in their reply to the question "Are Safety Patrols in Use?"

The value of school safety patrols is everywhere recognized by authorities and prominent educators. In fact, through the medium of a congressional committee this movement was given national recognition by means of an unqualified endorsement. When President Roosevelt, in May, 1936, addressed the school safety patrols convention held at Washington, D. C., he stated:

> The future belongs to youth, and when youth voluntarily assumes helpful activities like yours, for the benefit of the entire community, I, for one, feel ever so much more confident in regard to the future.

There are many benefits which have been derived from these patrols. The first benefit, of course, is the protection of the pupils. Moreover, the effect of the patrols on the character development of the pupil is an important factor. Many cities have found that these patrols stimulate the backward boys. One western city has included in the patrols boys who have been "problem children" to the police. This has proved to be an excellent idea in this city as these boys have developed the spirit of good citizenship and have ceased to be troublesome. The majority of the cities, however, require very high standards in both character and scholarship for membership in the patrols.

It has been found that knowing the theory of a subject is not always the knowing of the application of the theory. Therefore teaching safety through the patrols is teaching and practice of a theory.

Schools Having Safety Patrols—In studying the disbursement of safety patrols in the various school systems our study showed that 83 per cent of the 75 cities answering had safety patrols in the elementary schools, 71 per cent in the junior high schools, and 41 per cent in the senior high schools.

From the above it may be safely concluded that the majority of cities have found the patrols a necessity in the elementary schools, desirable to the well-being of the pupils in junior high school, and helpful to the senior high schools.

Supervision of Patrols—The patrols of the country are all organized on somewhat the same plan. They are, however, supervised in various ways.

It is impossible to give an accurate estimate of those cities using the assistance of the police, school department, and private agencies in the supervision of their safety patrols as 17 per cent of the cities were unable themselves to answer the question on supervision. This may be due to the fact that many of the

patrols are not under the immediate supervision of the board of education, but are handled by the principals of the individual districts or schools. It is also noticeable that the majority of the safety patrols in the cities are supervised by their local school departments while many of the patrols are directed by the local police department, and a very small percentage by private agencies. Some cities find it beneficial to have the police department assist the schools in their patrol work, while other cities have their school departments handle the entire patrol program.

Duties of Patrols—The duties of the patrols of the cities are uniform in that their purpose is the protection of the pupils while en route to and from school. Some cities also favor a patrol within the school and on recreation grounds. A large number of cities have a cadet or monitor system in the school buildings.

The duties in the directing of the vehicular traffic among the cities vary. The majority of the cities which state they do not allow the directing of vehicular traffic by members of the patrol, do not object to the patrol member raising his hand to warn motorists approaching a group of children who are crossing the street if he remains on the curb. They do not consider that this motion is directing or controlling the motorist, but merely calling his attention to his obligation under the law to respect the rights and safety of pedestrians at crosswalks.

It is shown that 31 per cent of the cities permit their patrols to direct traffic from the curb. This is found by many of the cities to be the most desirable way in which to assure a safe crossing for the children.

Of the cities having safety patrols, 25 per cent allow patrol members to control vehicular traffic in the street. This is a fairly large per cent in view of the fact that this is generally thought to be a poor practice.

Insignias—Of those in cities having safety patrols, 83 per cent wear insignias. The majority wear the Sam Brown belts while some wear arm bands signifying their membership in the patrol.

The use of whistles, flags, sticks, and stop signs by the cities varies. A majority of the cities absolutely forbid the use of any object in the hand, while a few allow their use to aid in patrol work.

In some instances private organizations supply the school patrols with slickers, rain capes or water-proof ponchos, and hats. One northeastern city believes that these ponchos and hats are an absolute necessity to the patrol boys on stormy days as accidents are much more likely to happen during stormy weather when visibility is low.

Conclusion on Safety Patrols—From the statistics gathered it may be said that the safety patrols are of the utmost importance. They have been tested and proved to be a decided benefit; first, to the community, in the saving of thousands of lives; second, to the youth, in character development; and third, in the training of youth in safety, so that the future, of which they shall be a part, will be years of security with freedom from the hazardous conditions existing today.

SUPERVISION

The policies pursued by the cities sending replies regarding the supervision of safety education varied. The statistical compilations show that of all the cities included in this survey, 47 per cent have their safety program supervised.

It has been the contention of prominent educators throughout the country that safety education supervision is vital to the complete fulfillment of the program. Dr. Herbert J. Stack of Columbia University pro-

posed the question, "Who shall direct the safety education of the public schools? Shall it be the Police Department, the local Safety Council, the Board of Public Utilities, the various chambers of commerce or other civic agencies?" Dr. Stack stated that his personal belief was that the direction and control of school safety activities in their entirety should be within the hands of the independent school administrations. Of course, the assistance of other agencies is acceptable, but the responsibility for the organization of the curriculum and the supervisory activities should be entirely in the hands of the superintendents and directors. He further stated that the best safety programs were those organized in cities where the superintendent designated the director of health or physical education as supervisor of safety. Justifying this statement he said:

> For without the coördination that this department can help provide through its trained teachers, the safety program is likely to suffer. No program can be effective unless it is well organized with responsible teachers to carry it out.

Further additional information as it was compiled revealed much data on safety education programs and their supervision in the American school system that was interesting and worth while. However, the variety of practices discovered leads to the conclusion that more uniformity is necessary for permanent gain along these lines.

It should not be a part of this new program to call into being additions which would still further bear down upon a civic unit already so costly as the school system, rather, it should be through the changing of educational attitude and the coördination and utilization of already existing agencies that the school safety work should be made more effective.

POLICIES

The policies pursued in all cities sending replies proved interesting and enlightening. It is quite evident that the outstanding need is a philosophy of safety education. With the accepted principles from such a philosophy the movement would have a guide to steer it through its youthful stage of development. Activities, content, and devices would then be tested by approved standards, and not alone by the trial-and-error method. This problem presents another possibility for some research worker to contribute to the safety education movement.

Safety Education Compulsory—Statistical compilations show that 49 per cent of the cities in the study have safety education as a requirement either by state law or local regulations, with approximately 13 per cent having a compulsory feature in both state law and local school regulations. On the other hand, 29 per cent have only a local compulsory requirement, while 7 per cent work only under the required state law.

In answering the questionnaire, some of the cities stated that although they have no compulsory requirement in either the state law or local school regulation regarding the teaching of safety, they do encourage instruction in safety and have it given in their schools.

Our study showed that nearly half the cities contacted considered safety education absolutely essential to the welfare of the pupil. This fact is emphasized by the compulsory feature in both state and local regulation. This per cent may even be considered greater as many cities not reporting a compulsory requirement included the study of safety in their curriculum.

Use of Commercial Safety Material—Statistics showed that 65 per cent of the cities authorized the use of commercial material in the classroom. How-

ever, only one of the 75 cities permitted this material to be given to the pupils to aid them in their study of safety. In 32 per cent it was the right of the teacher alone to use commercial material while both the teacher and pupil are permitted to use commercial material in another 32 per cent of the cities.

The policies of the cities varied regarding the use of commercial material. One New England city will allow the use of commercial material only if it does not "savor of advertising," while another school system authorizes the use of American Automobile Association and National Safety Council material as these groups are "non-dividend paying organizations." One school system in the north central section permits the use of commercial material only after it has been approved by the board of education. A southern city uses all commercial material with the name of the company deleted while a western city issues to its principals and teachers each month a "safety kit" which contains various booklets, pamphlets, and posters on highway safety.

In answering this question many cities answered in the affirmative with the restriction that the material must not be of an advertising nature. It may be said, therefore, that the majority of cities do use commercial material which is of value in the safety education field, but which does not advertise a product.

Special Safety Instruction—It was found on studying the compiled returns that instructions on crossing streets, playing in streets, traffic and signal regulations were given in 87 per cent of the cities in this survey. The majority gave instructions in the schools on all these subjects, while some gave instructions in just crossing streets and playing in streets, while a few conducted a course in only traffic and signal regulations.

These figures show that the majority of the school systems realize the importance of these three phases of safety education and include them as special topics in safety.

Primary Children Cautioned at Each Dismissal—From the statistics gathered it was found that 54 per cent of the 75 cities made it a practice to caution their primary children before each dismissal.

It is interesting to note that while some cities believe the younger children should be cautioned at each dismissal, others do not think it necessary because a well organized safety program with a definite time allotment is included in their curriculum.

PROCEDURE

The procedures used throughout were fairly uniform. But here again the schools should be guided by research and a sound philosophy.

Police Assigned for School Safety Work—It was found that police were assigned to school safety work in 77 per cent of the 75 cities contacted. A full-time schedule was listed in 28 per cent and part-time in 49 per cent.

The facilities of the police department are utilized by many of the cities in various ways. Those not assisted by the police in their safety talks and demonstrations receive the coöperation of the police in the safety patrol work and in the direction of school dismissal traffic.

The work of the police department coöperating with the school department is many-fold in its benefits. The police department can render invaluable assistance to safety education through their years of experience, by their badge of authority—not in the sense of coercion, but in the sense of prestige—and by the special training in safety work that many of these

officers receive. The statistics quoted show that the police departments are a recognized asset in aiding in the cause of school safety work.

Police Protection at Dismissal Time—Police protection of the school children at dismissal time was found to exist in 82 per cent of the cities. Of this percentage the majority stated that protection was given only at dangerous crossings. The elementary, junior high, and senior high schools have police on duty at dismissal time in 49 per cent of the cities, while 12 per cent had it just for the elementary and junior high schools; and 20 per cent had it for their elementary schools.

This study might well raise the question as to how any city can get along without police protection at dismissal time. For instance, one city reports no such protection since the formation of student patrols. It may be too that many cities not reporting here have well organized patrol systems and may not deem it necessary to request police assistance to supervise school dismissals.

Accident data distributed to teachers—Our study revealed that in the school systems of 68 per cent of the cities studied, accident data were distributed to teachers. The school department furnished records of all school accidents; the police department of all city accidents; and private agencies of accidents of all descriptions. Approximately 12 per cent of the cities collected accident information from all available sources; that is, school records, home accidents, police records, and records of private agencies; while school officials with the aid of the police department furnished data in 5 per cent of the cities. Private agencies assisted the school officials in distributing accident information in 6 per cent of the cities, while police accident data, only, are distributed in 6 per cent of the cities' school systems; private agencies furnish all accident information in 8 per cent of the cities. Approximately 28 per cent of the cities send to their teachers only accident material regarding school accidents furnished by the school officials.

From the comments made on the questionnaire and from additional information it is noticeable that many of the cities which use only school accident data tell us that they do, however, use material furnished by the different state or city departments, such as the department of public safety and the state highway department.

Auto Clubs in Senior High Schools—Auto clubs in senior high schools were organized in 43 per cent of the cities contacted. An extensive course in safe driving was found to be given in nearly all schools that have auto clubs. Some cities do not have clubs but do include driving courses in the curriculum.

Therefore, it would seem that auto clubs in senior high schools would be of great value inasmuch as these pupils are the future operators of vehicles and a training in the proper way to handle a car would reduce the accident rate in the years to come.

Student Safety Councils or Clubs—Of the 75 cities, it was found that 69 per cent conducted student safety councils or clubs in their school systems, and of these 16 per cent stated that they had safety councils but only in scattered schools.

Through these councils the student is given the opportunity to see and solve problems that occur in his daily life. The working out of actual problems through organized activities makes the student keener and more alert to existing conditions.

Organizations—From the additional information sent to us, it was found that the majority of cities with well organized safety councils have as their main objective the prevention of accidents by the removal of the causes. The first

step taken toward this goal was the formulation of a set of "Safety Laws" to govern the conduct of students. The administration of these laws is then taken into consideration. The following procedure is used by many of the cities:

1. The objectives of the Safety Council are presented at a meeting of the faculty.
2. A faculty representative is appointed.
3. The objectives of the Council are presented at a meeting of the student body.
4. Representatives are elected from each home-room (usually two).
5. The representatives meet with the faculty member for discussion of objectives and the duties of committees.
6. A meeting of the representatives is held for the election of officers and the drawing up and adoption of a constitution.
7. A meeting of the representatives is again held for the purpose of putting the constitution into effect and to appoint committees and to explain the specific duties of each committee to its members.

These elected representatives are active members of the council and other students are called associate members. The purpose of this is to stimulate interest and to unite the entire school in a common cause.

Duties—The duties of the council are many. The committees appointed make studies of the different types of activities and observe traffic conditions in the hallways and on the stairways and at dismissals. The reports are given to the faculty representative who takes them under advisement. If the recommendations are accepted an attempt is made to adjust the situation.

It has been found by some cities that the best results are obtained when the clubs are organized by schools and not individual grades. A club organized and controlled by the pupils themselves under supervision was found to produce the best results, and the cities having the councils are very enthusiastic about the results which they have obtained.

RESULTS

The rapid growth of safety education in the school systems of the United States is apparent. Not one city included in this survey shows a total lack of interest in safety education, whether of a formal or informal nature. It is noticeable that where the percentage is low in either separate or combined courses of study in safety, the percentage is high for activities such as councils, safety patrols, and auto clubs.

A separate course of study is being used in 51 per cent of the cities. Although 38 per cent state that they have no separate course of study in safety instruction, they do include safety in their health education program. Therefore, it may be safely said that 89 per cent are interested in safety instruction.

It was further shown that safety education is favored when approximately one-half of the cities reported safety education compulsory either by state law or local regulation.

A person was assigned to supervise safety programs in 47 per cent of the cities. The title of the person in charge varied in some instances. In one he was known as the Safety Engineer; in another he was called the Director of Safety; one listed a Director of Physical Education and Safety; but the majority were listed as Directors of Health and Safety Education.

A definite time allotment for the study of safety was given in only 36 per cent of the cities. It is interesting to note that a majority of the 51 per cent reporting a definite course of study assigned definite time allotment in their curriculum for safety instruction.

A vast majority have organized safety patrols which are conducted in the elementary, junior high and senior high schools. The patrols are supervised for the most part by the school

departments and police departments; a few cities being assisted by private agencies. Simple insignias are used by the safety patrols in the majority of these.

It is also noticeable that many of the school departments of the cities which have a system of collecting and investigating school accidents also distribute to their teachers data of accidents occurring outside of schools.

The use of commercial safety material in the classrooms of the schools varies, the majority of the cities allowing its use but with restrictions.

Special instruction in crossing streets at intersections, playing in the streets, traffic and signal regulations, is given in most of the cities, with only a very small percentage feeling that this instruction is not necessary.

A little more than half of the cities concerned, it was found, cautioned their primary school children at the end of each session, while the remainder relied on the police protection at dismissal time.

Safety councils, auto clubs, school patrols and other activities are carried on by many cities. In 35 per cent all three types of activities are encouraged. It is interesting to note that some that do not have safety patrols have safety councils or clubs.

The police have contributed their services to most of the cities' safety programs. Some have them part time, and others full time.

These facts on safety reveal that the school authorities of the country are mindful that the preservation of life is an obligation and duty which they must meet and discharge to the best of their ability. It has been shown through the returns by the 75 cities just how this obligation has been met.

Sioux Sanatorium Opened

THE Sioux Sanatorium was recently completed at Rapid City, S. C. This $272,000 government institution for the Sioux Indians was formerly the site of an Indian school.

Arthur Joseph Wheeler, M.D., superintendent of the Albuquerque Indian Sanatorium of Albuquerque, has been appointed superintendent of the new sanatorium.

Registration and Approval of Public Health Laboratories as Carried on in Connecticut*

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WITH so many public health activities resting upon the groundwork of laboratory findings there exists a need for official control over laboratories where daily are carried on examinations of body fluids and excretions, bacteriological or chemical analyses of milk, frozen desserts and milk products, or tests of water or sewage. Unfortunately, it is not difficult to call to mind public health laboratories where the quality of work carried on might be improved by the right kind of guidance. It may be profitable to review briefly some procedures and standards under which the quality of work in laboratories has been improved through supervision. Any suggestions presented will be offered with a full realization that conditions vary widely in different localities. It is a safe assumption that a set of procedures followed with some measure of success in one state could not possibly be successful in another without special adaptation to the new locale. The principles are applicable to all sections of the country.

Without general oversight from some official control agency there is no question that results will at times come forth from public health laboratories that may not only cause real annoyance to individuals concerned but that may seriously interfere with progress in public health, mar the good work of the physician and the health officer, and surely exert an adverse effect upon the health of the citizen if not, in the extreme instance, cut short his life. Where is the public health official who has not experienced embarrassment in attempting to explain conflicting laboratory findings on similar specimens examined in different laboratories! It is illuminating that in Connecticut the annoyances and losses of money caused to the milk industry by the analyses and interpretations from unsupervised laboratories—private and public—became so serious two decades ago that the industry itself, independent of the state control agencies, sponsored the passage of legislation that since then has required approval of dairy laboratories and the licensing of all personnel.

There are several reasons for unreliable reports from laboratories. The shyster who deliberately falsifies his findings for the benefit of his client has seemed to be much more of a rarity, even in the state that has won the sobriquet of "the Nutmeg State," than

* Read before the Laboratory Section of the Massachusetts Public Health Association at the Annual Meeting, Boston, Mass., January 27, 1938.

might be expected. Far more frequently encountered is the well intentioned person with a partial lack of training and experience who considers himself capable of making, and reporting to the public, examinations for infectious agents in body fluids, tests on dairy products, analyses of water or sewage, or other laboratory determinations. Too often even the college graduate with very little training in bacteriology, chemistry, or public health, and sometimes with no real experience, will attempt to carry on laboratory work and make interpretations of findings that would not be attempted by the expert with years of practice to his credit. The failure to use proper apparatus and the improper use of even the best of equipment are frequent causes of unreliable results. Dependence upon obsolete technics and methods not generally accepted may lead to troublesome findings. Many of the causes of unreliable reports may be favorably influenced by supervision.

Early in this discussion it should be emphasized that official supervision is not *per se* a panacea for all the ills of unsatisfactory laboratories. To be effective a system of control must be carefully planned and efficiently carried on. By themselves, authority and inspection will never produce some dreamed-of utopia. The best trained laboratory expert, whether supervised or not, has to be constantly on guard against the many pitfalls that beset the laboratory worker who tries to do a perfect job. No one can do a perfect job all of the time. At times even the well trained laboratory worker may become careless. Usually the person who performs laboratory tests inaccurately or who makes misleading interpretations from his findings is a reasonably honest individual striving to the best of his ability to earn a living by putting to use what training he has been able to secure. All too often the partially trained laboratory worker succumbs to the temptation to make tests for which his experience or educational background is inadequate. There still can be found poor laboratories in those states where approval is in force, and the well trained laboratory worker will occasionally make errors no matter how closely supervised. But these are the exceptions which emphasize the rule.

To bring about improvement under the conditions existing generally in public health laboratories, supervision must have as handmaidens education and coöperative effort. The supervising official who would be successful in improving quality of work must bring to his task interest in his work and a spirit of coöperation toward those with whom he works, and he must to a considerable extent be an educator and a tutor. Regardless of the authority he represents, he must be friend, fellow worker, teacher, and diplomat far more than he is inspector. Successfully to do these things he must be a trained and experienced public health laboratory man connected with some organization officially recognized for the enforcement of health legislation. It is not without reason that the state department of health has almost universally throughout the country been the repository for laboratory supervision. It is essential that in the approving of public health laboratories the state work in coöperation with the local health officer or local health department. The state health department has, or should have, an organization already perfected for dealing with local health interests. Neither in some other state control group nor in an organization national in scope can it be hoped to develop the flexibility necessary for adapting approval to local health conditions so easily or so well as it can be built up in the already functioning state health department.

With trained and experienced laboratory experts on its staff, with consultants always available on the epidemiological aspects and the water and milk and other problems, and particularly with a public health council or board already constituted for keeping regulations and rules within proper bounds, the health department appears to be the logically supervisory agency.

It is not that an officially designated body will be enabled to improve the quality of work in local laboratories by some magic show of policing authority. Rather will results be accomplished by restraint in the use of a potential power held in reserve for the very occasional instance where coercion is needed. The power to revoke approval that has been extended furnishes a handy correctional weapon and provides opportunity to make thorough investigation in the infrequent instance when it is necessary, but it is rather through educational effort and coöperation extended to local laboratories over long periods of time that in a manner not at all magical the quality of the work can be made to improve in both the good and the mediocre laboratory while the bad laboratory may solve its difficulties by passing out of existence. Through supervision, methods and procedures in widely separated laboratories may be unified, and research and incentive stimulated. Slow moving constructive effort will do what magic cannot accomplish.

GENERAL OR SPECIFIC APPROVAL

Laboratory approval may be a sort of blanket approval extended to a laboratory after inspection of the equipment and investigation of the qualifications of the personnel or the person in charge to cover any and all work that may be done. On the other hand, it is entirely feasible to limit approval to a specific list of tests and to insist that the results of no examination not on the list be used or published until approval has been extended to cover that test. Blanket approval is beset with difficulties chiefly because the person in charge of a laboratory may be capable of making certain tests and yet be incapable of making or interpreting the results of some other determination. For example, many well trained chemists may not have the background of training to make and interpret properly rather simple bacteriological tests. Limited approval for specific lines of work is more generally in vogue and more to be recommended than is unqualified approval.

LAWS AND REGULATIONS

Prerequisites for official control of laboratory work, in whatever field, are law and regulation. A law may be either simple or involved. An example of the former is a statute requiring merely that any laboratory making specified examinations be either registered with or approved by the official control agency. A law requiring approval of every laboratory if it is to exist may work hardships upon an individual or a corporation, and a law providing alone for registration is not to be recommended; but when compulsory registration of all public health laboratories is combined with provision for approval of those laboratories meeting specified standards for high-grade work then registration becomes merely a sort of notice to the state and its citizens that a laboratory is being conducted at a stated location, while those laboratories meeting established standards enjoy the benefits that accompany official sanction. Under such legislative enactment no great amount of control is exerted over the registered laboratory —at least until the quality of work in a specific instance is so poor as to occasion serious complaint demanding investigation—but there is established a complete directory of laboratories

carrying on every phase of health work. Supervision is exercised only over the laboratory that has applied for and received approval. The public becomes educated to demand the services of the laboratory that can qualify under the law. Although the poor laboratory may become labelled as such by inference it is not legislated out of existence.

Under most circumstances it is desirable to have the law as simple and brief as is consistent with rather broad powers, and preferably to have it provide full authority for the approving agency to promulgate rules, requirements, and standards upon which approval shall be based. Power of revocation of approval for cause should be provided in the law, and the approving agency should be given full powers to make check tests or investigations desirable to determine at any time the accuracy of methods followed or the ability of the person in charge to report on or interpret any particular test. General provisions for enforcing the law in Connecticut are in the form of sanitary code regulations; departmental rules provide detailed procedures. With provisions made for enactment of a code and promulgation of regulations, the law itself may be concise yet comprehensive.

All types of public health laboratories should under the law be required to register, including those in city departments of health, in educational institutions, in hospitals, in milk plants, and those laboratories operated commercially or privately for profit. If registration of all laboratories is not required, the law may later be found to contain embarrassing loopholes. Experience has not revealed objection on the part of old established educational institutions and hospitals to register annually, and most apply for approval because usually there is no difficulty in meeting the requirements. This tends to strengthen and give broad scope to the activity and helps to maintain high standards.

The limiting of approval to apply only to those tests where the results will be published or "used" for the purposes of diagnosis of communicable disease or release from quarantine or as the basis of an opinion of sanitary quality or one that involves the public health, has been found to have advantages. Under a law into which that provision is embodied a laboratory operated by a milk plant for the examination of samples of the firm's own product and of producers' supplies would be exempted from approval. Thus the law would not intrude into the private business of an individual or a firm. The laboratory technician at a milk plant might even become interested in testing the products of competitors and could legally do so under this type of law without applying for approval unless the results were published or some of them "used" by salesmen or in some other way such that the sales or interests of competitors might be affected or unless the products of the firm were advertised on the basis of the findings obtained. Should the results be used in such fashion it is evident the requirement of approval should apply. The situation is similar in respect to the water or sewage laboratory or regarding the physician who examines specimens in his own practice or the private sanitarium or institution making certain routine cultures or examinations of smeared preparations collected from patients remaining more or less permanently in the institution.

HOUSING AND QUARTERS

It is rather universally considered that adequate housing for the laboratory should be made a prerequisite for approval. Reasonably reliable examinations even of a bacteriological character can be carried on in fairly crude

quarters if the rooms are decently clean. For that reason standards for housing should not be set too high. Yet in this day and age it is certainly not going too far to require clean, comfortable, fairly commodious, and well lighted working quarters without involving undue expense. Regulations should be sufficiently flexible to allow the common sense and good judgment of the approving official a reasonably wide range of play. Requirements should be designed to encourage improvement in the housing of laboratories.

EQUIPMENT AND SUPPLIES

In a system for the control of laboratories provision should be made for requiring the use of standard equipment. It may be sufficient merely to require that apparatus be complete and in good order at all times as considered necessary for making each determination, examination, or analysis according to the method which the person in charge has agreed to follow. Such a requirement allows the control official enough leeway to meet special situations and yet gives him the necessary authority for insisting that standard supplies be used. Inspection should be provided to determine at reasonable intervals that the several kinds of apparatus in use are maintained adequate for any increasing volume or changing lines of work and that all equipment is kept clean and in good condition. It is surprising how far afield in using broken and worn-out equipment well trained laboratory technicians—and for that matter even directors of laboratories—will allow themselves to go where there is no supervision. Regardless of your or my opinion of the value of a particular laboratory test we would be agreed that the test had better be left undone than to be poorly or indifferently made because of poor equipment. Inspection should be and can be so planned and carried out as to eliminate bad apparatus and promote the use of good standard equipment, supplies, and reagents.

METHODS AND PROCEDURES

The value of the work done in a laboratory usually is more a function of the method or procedures followed and of the accuracy and intelligence with which they are adhered to than it is a function of the housing and equipment. It is desirable there be definite agreement on the part of the person in charge of a laboratory before approval is extended that any test or analysis will be made strictly in accordance with specified methods. These may be the standard methods of the American Public Health Association, the Association of Official Agricultural Chemists, or another similar organization, or it may be preferable to specify they be the latest edition of the particular method approved by the supervising agency, which in turn can be made the standard method most widely recognized. Standard methods national or international in scope may not be altogether applicable to local situations or quickly amenable to changed conditions. It is a wise precaution to provide authority not only for demanding adherence to methods and procedures drafted by the regulating authority but also for setting up the machinery to modify them from time to time when the need arises.

LICENSING OF PERSONNEL

In some states the licensing of personnel is considered a sufficient safeguard against laboratory work of poor quality without any requirements affecting the laboratory itself; in other places, licensing of personnel is merely a prerequisite for approval of the laboratory; in still others, approval is extended without the actual issuance of licenses

to the personnel. It is sometimes customary to require the applicant for a license or a certificate of proficiency either to pass an examination or to submit credentials from an accredited institution of learning which certify that certain courses in bacteriology, chemistry, or public health have been completed with satisfactory passing grades. In one state a person passing an examination to do the simpler tests must later take a second, or even a third, test before receiving a license to make other more complicated determinations or to take charge of a laboratory. In Connecticut the person in charge of an approved laboratory must possess certain qualifications evidenced by investigation of credentials or by examination conducted by the approving authority. Full responsibility for the operation of the laboratory is then placed on his shoulders and the credentials of the other workers are not investigated. The qualifications of the heads of laboratories that are merely registered are not investigated since no responsibility is assumed by the registering authority for the quality of the work in those laboratories. This is because registration is considered merely as notice that laboratory tests are being made at that particular place without having the endorsement of the state department of health.

RESPONSIBILITY OF THE HEAD OF THE LABORATORY

When approval is extended to a laboratory, the writer believes that some person—ordinarily the one in charge—should be made strictly accountable for the accuracy of the work done and for the reliability of the interpretations issued from the laboratory. Experience has indicated that requiring the signature before a notary of the person concerned brings home the seriousness of the approval agreement in an effective way.

The person in whose name the laboratory is approved may be required to subscribe under oath to some such signed statement as the following one:

A. I agree that the conduct of the laboratory will be strictly in accordance with recognized standards of laboratory ethics and that no method or procedure will be followed that does not meet the approval of the certifying agency.

B. I agree that no examination aside from those listed on my application blank, will be made without notice being given promptly in writing to the approving agency that such an examination has been made. I also agree that as the person in charge I will upon request furnish the approving agency with a complete description of any method or procedure followed in making any specified determination for which approval is extended.

C. I agree to be responsible for the accuracy and reliability of the findings made by any person or persons employed in the laboratory, and for any interpretation based upon those findings.

D. I agree that if at any time I am engaged on a part-time basis I will inform the approving agency of the approximate amount of time given to this position.

E. I agree that in the event I sever my connection with the laboratory, or am about to sever it, I will immediately notify the approving agency in writing and return the certificate of approval; and also that I will notify the approving agency in writing prior to taking extended leave-of-absence.

F. I agree to return, on December 31 of each year, the certificate of approval issued for the expired year.

COSTS AND FEES

The question may be asked: Do the benefits from registration and approval justify the costs involved? Similar questions were doubtless asked when licensing of physicians was an issue before the public and when other licensing and supervisory measures were first proposed. Upon the extent of the need for it should the decision to undertake the project rest, rather than upon the costs that will be entailed. Aside from salaries for clerical work and the cost of certificates and printing, the chief expense will be for time and travel of the inspector or supervisor. He should

be a trained and experienced public health laboratory expert and should have an adequate salary. A well trained man can visit several laboratories in one day if they are not too widely separated and do a thorough job of inspecting. If the health department is the approving agency, a person already a member of the laboratory staff may be assigned to this work on a part-time basis and thus approval be combined with a sort of liaison service between the department and the local health officers and the staffs of local hospitals and institutions in a way that both lessens the cost of supervision and further justifies the expense. Fees may be charged for registration to cover in part the inspection costs, but this has not been done in Connecticut. At least one state provides state aid to approved laboratories but need has not been felt for that in Connecticut.

THE VALUE OF AN APPROVAL SYSTEM

At times there are issued from public health laboratories reports of findings that are inaccurate, and interpretations of laboratory tests ranging from conclusions merely misleading to opinions which may upon occasion adversely affect the health of the public, shorten the lives of citizens, or ruin the reputations of milk producers or other individuals. Erroneous or fallacious laboratory reports and conclusions tend to lower the confidence of the public in the work of laboratory testing in general. Very occasionally unreliable reports are the outcome of dishonest attempts to mislead. Far more often they result from careless or thoughtless errors on the part of well meaning persons improperly qualified and experienced to make and interpret particular tests. Perhaps even as frequently mistakes occur because the analyst has failed to follow an improved and up-to-the-minute procedure that should have been readily available to him or because he has used poor equipment, supplies, or reagents that have rendered the findings unreliable. Once in a while an experienced person in charge of a busy laboratory may base an interpretation upon unreliable findings or upon tests made by an unqualified or careless person.

If the person in charge of a laboratory is legally required to obtain a certificate of approval before reporting any test where the results will be used or published, this step will go far toward improving the quality of the work providing a well organized system of approval and inspection gives opportunity year after year for education and coöperative effort to function along with the regulatory aspects of approval. If the laboratory director has agreed under oath to surround the work with a variety of safeguards, is he not more likely to supervise each analysis carefully and to weigh well the conclusions based upon the laboratory findings? Requirements for adequate housing and standard equipment, apparatus, and reagents are desirable, but even more important is provision for determining the qualifications of the person in charge—either by examination or through investigation of credentials—before approval is extended. It is likewise important that the person in whose name approval is granted be required to sign an agreement with the certifying agency that specified standards for high grade work will be consistently maintained and that acceptable methods and procedures will be followed.

Experience in Connecticut indicates that under a system of approval laboratories issue fewer conflicting reports than formerly and that there are less complaints from physicians and patients and not so many objections from persons whose products are under test. Improvement of methods can be secured by a process of selection of the best technics without deadly standardi-

zation taking place. Under a system of approval, which need not be unduly expensive, there is added incentive for persons owning and operating laboratories to man them with qualified personnel and increased opportunities for technicians to demand proper equipment and supplies with which to work. This is bound to lead to service of better quality. Research activities can be stimulated toward discovery of new methods. In several instances a statewide association of laboratory directors and technicians has been the outgrowth of a system of approval—evidence that benefits arise from the system.

With a carefully planned system of laboratory approval in operation it should seldom be necessary for the vested authority to be exercised, but the machinery is set up for preventing the bungler or the novice from issuing laboratory reports, for supervising the shyster laboratory, and for improving the quality of work in the laboratory where the training or experience of the personnel is barely adequate for carrying on the variety of tests for which approval has been extended. With compulsory registration of all public health laboratories with the state health department and provision for approval of those that meet specified requirements, the state or commonwealth need not interfere in the business, or with the livelihood, of any of its citizens; yet this important public health service will be placed on a higher plane to the benefit of many persons. By means of educational efforts and well directed publicity the public can be taught to expect differences in the service rendered by the approved laboratory from that to be expected from the one which is only registered. It would seem that no laboratory should be the worse for being under a properly conducted system of registration and approval, and certainly the poor laboratory should be improved or show cause to the public why it should continue to prosper or even to exist.

Development of International Coöperation Among the Health Authorities of the American Republics

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INTERNATIONAL Sanitary relations leading to coöperative effort among the health authorities of the American Republics have followed a harmonious and evolutionary course over a period of half a century; that is, since the general health conference which met in Washington in 1881, at which both European and American countries were represented.

At the First and Second International Conferences of American States, held respectively in Washington in 1889, and in Mexico City in 1901–1902, international public health was a leading subject in the agenda. The latter of these conferences recommended that—

> A general convention of representatives of the health organizations of the different American Republics shall be called by the governing board of the International Union of American Republics to meet at Washington, D. C., within one year from the date of the adoption of these resolutions . . . that said convention shall provide for the holding of subsequent sanitary conventions . . . that it shall designate a permanent executive board . . . to be known as the International Sanitary Bureau with permanent headquarters at Washington, D. C.

These brief quotations set forth the historical background involved in the creation of the Pan American Sanitary Bureau and the Pan American Sanitary Conferences, 9 of which have been held to date, the 10th being scheduled to meet in Bogotá, Colombia, in September of this year. Previous conferences of this series have been held in Washington in 1902 and 1905; Mexico, 1907; San José, 1909–1910; Santiago, Chile, 1911; Montevideo, 1920; Habana, 1924; Lima, 1927, and Buenos Aires, 1934.

In addition, between the dates of the meetings of the sanitary conferences, the Directing Heads of the National Departments of Health of the American Republics have lately been called to meet in Washington to discuss administrative and other public health problems of mutual interest, at intervals of 5 years. Three of these latter meetings have been realized: in 1926, 1931, and 1936.

Sanitary Conventions or Treaties—The Second International Sanitary Conference, held in Washington in 1905, concluded *ad referendum* the Sanitary Convention of Washington, which was ratified by Costa Rica, Cuba, Chile, Ecuador, United States of America, Guatemala, Mexico, Nicaragua, Peru, and Venezuela; and adhered to by

Brazil, Colombia, El Salvador, and Honduras. This first treaty of international American public health became therefore applicable in 14 of the 21 American Republics.

At the Seventh Pan American Sanitary Conference held in Habana in 1924, the Sanitary Convention of Washington was amended, rewritten, and renamed the Pan American Sanitary Code, and has been ratified by all the American Republics. It bears the distinction of being the first Pan American treaty to be accorded this unanimous approval.

The Pan American Sanitary Bureau —Although the organization of the International Sanitary Bureau was effected by the First International Sanitary Convention in 1902, this body did not take actual form as an autonomous entity until the year 1922, following its reorganization by the Sixth Pan American Sanitary Conference of Montevideo, Uruguay, in 1920, and coincident with the beginning of the publication of the *Bulletin of the Pan American Sanitary Bureau*. Its further development and recognition were materially aided by the adoption of the Pan American Sanitary Code, which more clearly defined its functions and duties.

As at present constituted, the Pan American Sanitary Bureau consists of an honorary director, a director, a vice-director, a secretary, 4 members, and the provisional president of the forthcoming Pan American Sanitary Conference, all elected by the Ninth Pan American Sanitary Conference at Buenos Aires (1934) and constituting the Directing Council. All sections of the Americas are thereby represented. Under the terms of the Pan American Sanitary Code, a fund of not less than $50,000 is contributed annually by the 21 American Republics to carry on its activities.

Traveling Representatives — As an effective and practical means of attaining its aims of coördinating the health activities of the Republics of the Americas, the Sanitary Bureau has appointed from time to time traveling representatives. Their mission is to coöperate with the national health authorities of the various Republics. Since 1927, 12 such representatives have been named, 4 being on duty at the present time. In addition, 3 sanitary engineers, engaged in mosquito studies and surveys of public water supplies and sewage disposal systems are similarly employed.

Of signal interest in the international public health field has been the work of these representatives especially in the antiplague campaigns in the Republics of Ecuador and Peru, since 1929 and 1930, respectively. Active measures have been carried out for trapping and poisoning of rats, flea surveys, study of the epidemiology of active foci of disease, and especially aiding in the prompt reporting of human cases and deaths from plague, and of rodent infection, to the Pan American Sanitary Bureau and through this agency to the health authorities of the American Republics and to the International Office of Public Health with which the Sanitary Bureau coöperates.

Another disease of international import, viz., yellow fever, has received considerable attention. Traveling representatives have been detailed to cooperate in the studies of the Rockefeller Foundation, and special measures have been adopted to vaccinate against yellow fever the crews of airships in international traffic and to promote vaccination of flight personnel of national airways in each country. Under a coöperative plan devised by the Pan American Sanitary Bureau, certificates of origin are provided for air travelers in international traffic when deemed expedient, in an endeavor to have a record of their whereabouts dur-

ing the 6 days prior to departure from yellow fever endemic areas.

Reporting of disease—To be of any value, the reporting of dangerous communicable diseases must be prompt and complete. By cable, by airmail, and by ordinary correspondence, the Sanitary Bureau constantly receives reports of diseases from the American Republics. These data are compiled and immediately released in the form of a *weekly report* mailed to all the sanitary authorities of the Pan American countries and to interested international health organizations. Whenever urgent, the information is cabled or sent by air mail.

Publications—In line with the purposes for which it was created, the bureau has endeavored to broaden its scope by a far reaching program of education in preventive medicine and sanitary science, especially adapted to the needs of the health officer, the practising physician, the sanitary engineer, the visiting nurse, and other health workers. Consequently, it has been the policy of the bureau to have its monthly *Bulletin,* with a present issue of approximately 9,000 copies, distributed as widely as possible. The *Bulletin* is thus received by physicians and health authorities and others concerned, in almost every town of 2,000 inhabitants or over throughout the Latin American Republics. Although the material is mostly in Spanish, articles are also carried in French and Portuguese and occasionally in English. If there is no local physician in a small village, attempt is made to reach a pharmacist, nurse, teacher, midwife, or some other person in the locality who may be interested in the prevention of disease and in the conservation of the health and well-being of the people.

Coöperation with international health agencies—The bureau follows closely the work of the International Health Division of the Rockefeller Foundation in matters involving health problems in the Americas. Moreover, the Constitution and By-Laws provide that "The Pan American Sanitary Bureau shall coöperate with the International Office of Public Health of Paris, and also with other international bodies such as the Health Section of the League of Nations."

Through an exchange of correspondence, and under the provisions of Article 7 of the International Sanitary Convention (Paris, 1926), the Pan American Sanitary Bureau acts as the Regional Agency of the International Office of Public Health of Paris in the collection and transmission of information relating to health and sanitary conditions in the American Republics. By virtue of this arrangement, the Pan American Sanitary Bureau transmits to the Paris Office reports of communicable diseases occurring in the republics of the Western Hemisphere, and in turn relays to them the reports received from that Office relating to such diseases in other parts of the world. This arrangement avoids duplication of effort and provides a satisfactory basis of coöperation and understanding in international health relations between the Eastern and Western Hemispheres.

Miscellaneous activities—The Pan American Sanitary Bureau follows very closely all international medical relations in which the American Republics are concerned, usually being represented at important health congresses of whatever nature. No opportunity is overlooked to bring about better understanding among scientific health workers, especially those of the medical and engineering professions.

Following the recommendation of several conferences in the past, the bureau undertook the translation of the latest edition of the *Pharmacopoeia of the United States* into Spanish, in order that it may be made available in those countries where this language is spoken. This was undertaken in coöperation

with the Board of Trustees of the United States Pharmacopoeial Convention, its main purpose being to secure better and more nearly uniform standards of strength and purity for the drugs used in the treatment and prevention of disease, and also to serve as a ready reference to those countries in the preparation of their own national pharmacopoeias.

Another of the important activities of the bureau is its mission as a consulting agency. Inquiries are constantly received from health officers and others involving problems of public health administration, treatment, research, statistics, and many other features.

The bureau also compiles and publishes vital statistics of the American Republics.

CONCLUSION

This brief survey of the Pan American Sanitary Conferences and the Pan American Sanitary Bureau sets forth their historical background and their development over a period of half a century, though most of the activities of the bureau have been developed within the last decade. In a harmonious and coöperative spirit, it has been possible to attain the elimination of drastic quarantines, to secure the prompt reporting of quarantinable diseases, to aid in obtaining increased appropriations for public health work, and to demonstrate the usefulness of the Pan American Sanitary Conferences and their executive organ, the Pan American Sanitary Bureau, in the ever increasing field of international coöperative measures in the interest of all the people of the various republics concerned.

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Positions and Rates of Pay in Public Health Agencies*

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THE positions of 19,000 persons as reported by health agencies with an annual pay roll of some $23,000,000 should, on analysis, be of interest to the public health administrator and to the employee. Distribution of various types of employees within a given budget reflects the nature and extent of a program since approximately 75 per cent of the expenditures among health agencies covered by this study were consumed by salaries paid to staff members. Indexes, such as average salaries, may be of assistance to the administrator in allocation of funds necessary to supply the personnel required for contemplated health activities. Average salaries received by groups of employees with varied training and technical qualifications offer to the prospective public health worker some information in regard to opportunity for remuneration in this rapidly developing field of public service.

Information about employed personnel which forms the basis for this study was submitted among other data by some 2,500 agencies in health jurisdictions confined to areas within county limits. These agencies functioned in 94 counties of 19 states scattered throughout various sections of the country. The total inhabitants numbered approximately 34,000,000. As may be noted in Table III, the sample is heavily weighted with populous counties and with those having a high percentage of urban inhabitants; within this sphere, however, it presents a satisfactory cross-section of the social, economic, and industrial development of the United States. Data received from the 2,500 classified public health agencies were not in every case suitable for analysis, inasmuch as some 650 organizations rendered public health service in a limited fashion or to such a small degree that returns would have little meaning for this study. The majority of these were primarily interested in phases of activity other than that of rendering direct public health service. This group may be dismissed with the statement that they were not operating agencies in the public health field, although they bore such classification in local directories. The detailed discussion will, therefore, deal with data submitted by 1,861 agencies having some tangible organization and program.

Of the 1,861 agencies studied, approximately 75 per cent were under governmental control, and are referred to as official agencies. This percentage includes a large number of lone health officers, the great majority of whom devoted only a part of their time to

* From the Division of Public Health Methods, National Institute of Health. Study conducted in connection with the National Health Inventory.

TABLE I

Distribution of All Full- and Part-time Employees in Health Agencies of 94 Counties According to Type of Employing Agency

Types of Agencies	Total Agencies	Distribution of Personnel: Number of Personnel: Total	Number of Personnel: Full-time	Number of Personnel: Part-time	Personnel per Agency: Total	Personnel per Agency: Full-time	Personnel per Agency: Part-time	Personnel per 100,000 Population*: Total	Personnel per 100,000 Population*: Full-time	Personnel per 100,000 Population*: Part-time
All agencies	1,861	18,917	12,574	6,343	10.2	6.8	3.4	55.7	37.0	18.7
Official	1,419	13,126	9,283	3,843	9.2	6.5	2.7	38.6	27.3	11.3
Health departments	295	10,077	7,996	2,081	34.2	27.1	7.1	29.6	23.5	6.1
Lone health officers	780	780	48	732	1.0	0.1	0.9	2.3	0.2	2.1
Other official	344	2,269	1,239	1,030	6.6	3.6	3.0	6.7	3.6	3.1
Nonofficial	442	5,791	3,291	2,500	13.1	7.4	5.7	17.1	9.7	7.4
Maternal and child hygiene	77	650	351	299	8.4	4.5	3.9	1.9	1.0	0.9
Tuberculosis	54	923	291	632	17.1	5.4	11.7	2.7	0.9	1.8
Nursing	51	1,693	1,533	160	33.2	30.1	3.1	5.0	4.5	0.5
Other nonofficial	260	2,525	1,116	1,409	9.7	4.3	5.4	7.5	3.3	4.2

* Total population 33,978,479

health duties. The other agencies were non-governmental and carry the designation of nonofficial or voluntary. Table I presents the distribution of all full- and part-time individuals according to type of health agency. Briefly, official agencies engaged on the average 6.5 full-time and 2.7 part-time persons, as compared with 7.4 full-time and 5.7 part-time persons employed by the nonofficial group. If health departments alone are considered the number per department was considerably higher, being approximately 27.1 full-time and 7.1 part-time persons. The total number of people employed by all health agencies per 100,000 inhabitants was 55.7. The rate for full-time and part-time employees was 37.0 and 18.7 respectively. Approximately three-fourths of the full-time and three-fifths of the part-time workers were employed by the group of official agencies.

Nurses constituted the largest single group of full-time employees in both the official and nonofficial group (Table II). In relation to personnel of other classes the proportion of nurses was much higher, however, for the nonofficial agencies than for the official. The 295 health departments reporting

TABLE II

Distribution of All Full- and Part-time Employees in Heath Agencies of 94 Counties According to Type of Agency and Type of Personnel

Types of Agencies	Total Agencies	Total Personnel: Full-time	Total Personnel: Part-time	Employed Personnel of Different Types Devoting Full- or Part-time to Duty: Staff Physicians: Full-time	Staff Physicians: Part-time	Clinic Physicians: Full-time	Clinic Physicians: Part-time	Nurses: Full-time	Nurses: Part-time	Dentists: Full-time	Dentists: Part-time	Inspectors: Full-time	Inspectors: Part-time	All Others: Full-time	All Others: Part-time
All agencies	1,861	12,574	6,343	557	1,364	312	1,978	5,795	481	136	682	1,162	218	4,612	1,620
Official	1,419	9,283	3,843	523	940	259	1,273	3,763	267	92	262	1,159	214	3,487	887
Health departments	295	7,996	2,081	442	378	160	915	2,921	143	76	140	1,157	200	3,240	305
Lone health officers	780	48	732	6	263	...	...	...	...	...	...	...	...	42	469
Other official	344	1,239	1,030	75	299	99	358	842	124	16	122	2	14	205	113
Nonofficial	442	3,291	2,500	34	424	53	705	2,032	214	44	420	3	4	1,125	733
Maternal and child hygiene	77	351	299	14	23	32	149	145	41	2	2	...	...	158	84
Tuberculosis	54	291	632	1	5	6	186	74	16	2	152	...	...	208	273
Nursing	51	1,533	160	...	6	...	80	1,324	46	...	4	1	...	208	24
Other nonofficial	260	1,116	1,409	19	390	15	290	489	111	40	262	2	4	551	352

in this study employed 2,921 full-time and 143 part-time nurses, or an average of 9 nurses in all for each 100,000 population. Nonofficial agencies employed an average of 6.6 nurses for a similar population unit. The agencies combined reported 5,795 full-time and 481 part-time nurses, or an average of 18.5 per 100,000. Second in order of magnitude was the group designated "all others." This term is rather inclusive but for practical purposes it may be taken to mean clerical personnel. True, engineers, bacteriologists, chemists, and statisticians are included but they were not numerous in proportion to the total. The third largest class of people employed was that of inspectors. Such workers, as a rule, were not found in voluntary agencies since they are usually engaged on activities which require the application of sanitary laws that only representatives of government are empowered to enforce. Thus, as expressed by pay roll structure, sanitation—an activity of official agencies for many years—even today is playing an important rôle in the program of health departments.

Medically trained persons made up the group ranking next in number; 782, or 8 per cent of all full-time persons in official health agencies, were physicians. Of these, two-thirds were staff members, while the others were employed exclusively in clinics. On the other hand, but 87, or less than 3 per cent of the full-time personnel listed by the nonofficial group, were reported to have had medical training. The relatively small number of full-time physicians rendering public health service was offset somewhat by the large number of physicians serving on a part-time basis. In the official group of agencies 2,213 employees, or 57 per cent of the part-time personnel, were medically trained; for the nonofficial group 1,129, or 45 per cent, were of this class.

Only 136 full-time employees in both the official and nonofficial agencies were dentists, but it is well to note that oral hygiene programs as a rule are sustained in a large measure by part-time dentists and by dental hygienists who do not hold a regular degree in dentistry.

Because of the nature and content of programs, employees of a particular class may be expected to predominate in the staff of certain organizations. Nursing agencies, for example, employed a greater number of nurses in proportion to the total personnel than did other organizations. The agencies classed as "other official," mostly schools, showed a high ratio of staff physicians to all personnel employed. The nonofficial group of agencies with maternal and child hygiene as their chief interests employed proportionately more clinic physicians than did any other type of agency. Organizations concerned primarily with tuberculosis engaged a high proportion of employees

TABLE III

Employment Rate of Different Types of Full-time Personnel in Health Agencies of 94 Counties According to Population of the County

County Population Group	Number of Counties	Total Population	Full-time Personnel per 100,000 Population						
				Physicians					
			Total	Staff	Clinic	Nurses	Dentists	Inspectors	All Others
All counties	94	33,978,479	37.0	1.6	0.9	17.1	0.4	3.4	13.6
Under 20,000	15	191,274	17.8	1.0	0.0	11.1	0.0	1.0	4.7
20,000–59,999	25	856,580	14.1	1.2	0.0	8.4	*	1.0	3.5
60,000–99,999	14	1,020,428	18.6	1.5	0.3	8.8	0.1	2.2	5.7
100,000–499,999	26	7,163,930	32.2	1.7	0.3	15.3	0.3	3.1	11.5
500,000 and over	14	24,746,267	40.1	1.6	1.2	18.2	0.5	3.7	14.9

* Less than .05.

in the unspecified class designated as "all other."

For comparative purposes, staffs were also considered in terms of the number of employees per 100,000 inhabitants in counties of different population groups. Table III presents such rates. All of the health agencies studied, when combined, employed 37 full-time persons per 100,000 population. The group of counties with 500,000 or more inhabitants revealed the highest rate, which was 40.1. It may be readily observed that, in general, the rate for each class of employee increased as the counties were found in higher population classes. Counties with less than 20,000 inhabitants showed deviation from this array in two instances. Nurses and the class designated "all others," showed a higher rate per 100,000 than that found in the group of counties next in order of size.

As noted previously, relatively few dentists and clinic physicians serve on a full-time basis. A striking point is the rapid increase in rate of employment for persons designated "all others" as counties occupy larger population groups. In some degree this increase represents additions to the technical staff of engineers, laboratory workers, statisticians, and persons with related training, but a much larger proportion is due to the greater number of clerks and helpers of various types.

The average annual salary of whole-time staff physicians was higher in health departments than in either the other official or the nonofficial group of agencies. This is made evident in Table IV. Nonofficial agencies paid the medical group an average salary of $2,911, as compared with $3,014 in health departments and $2,141 in the other official group. Clinic physicians received a much smaller salary, the sum being lower than one might expect. The average salary of this group as reported by all agencies was $1,636. This does not appear comparable with salaries paid to other employees of similar or lower grades.

The average remuneration for nurses in the several types of agencies was about $1,500. This uniformity is perhaps due to two factors: (1) the large number of nurses reported; and (2) the basic similarity in their training and duties. The divergence in salaries paid to dentists by official and nonofficial agencies was as great as that found in the case of clinic physicians. However, nonofficial groups paid dentists lower salaries than did governmental agencies, whereas their practice was reversed with respect to payment of clinic physicians. Inspectors were paid an average salary of approximately $1,900 by health departments, but this figure cannot be contrasted with those of other agencies since so few employed inspectors. The remaining miscellaneous group of health department employees averaged in salary $1,545 per person or approximately $250 more per year than the amount received by the nonofficial miscellaneous group.

TABLE IV

Number of Full-time Employees in Health Agencies of 94 Counties and the Average Salary Paid to Specified Types of Personnel by Agencies of Each Class

	All Agencies		*Health Departments*		*Other Official*		*Nonofficial*	
Type of Personnel	*Number of Employees*	*Average Salary*	*Number of Employees*	*Average Salary*	*Number of Employees*	*Average Salary*	*Number of Employees*	*Average Salary*
Staff physicians	557	$2,881	442	$3,014	81	$2,141	34	$2,911
Clinic physicians	312	1,636	160	1,415	99	1,659	53	2,263
Nurses	5,795	1,484	2,921	1,463	842	1,503	2,032	1,507
Dentists	136	1,961	76	2,151	16	2,171	44	1,556
Inspectors	1,162	1,915	1,157	1,915	2	1,890	3	1,876
All others	4,612	1,472	3,240	1,545	247	1,315	1,125	1,297

As a supplement to the data on full-time employees and their respective average salaries found in Table IV, some mention should be made of the 780 lone health officers. Of the 732 who served on a part-time basis, 452 reported data on money received; the others either received no compensation or failed to record satisfactory information on this question. Only 10 of the 452 received more than $1,000. The average for all was $197 per year, while the highest paid received $2,400. Among the 47 full-time lone health officers, the lowest salary was $300, the highest $4,000, and the average $1,470.

Of the 1,861 health agency administrators, including the lone health officers, 21 per cent failed to record salaries and 12 per cent received none. Most of those who gave no information regarding their salaries were in charge of official agencies. Among the group reporting on salary no full-time administrator of an official agency worked gratuitously, but there were 8 with nonofficial organizations who served without pay. In 95 official and 104 nonofficial agencies part-time administrators received no remuneration.

In Table V are presented, on the basis of professional training, the reporting group of 1,254 administrators, classified as to full- or part-time employment. The median salary and interquartile salary range for directors of each classification are also shown. The largest number of full-time executives in the official groups were physicians with a salary range of $3,205 to $5,683 paid to the middle 50 per cent. The remuneration of those serving as full-time heads agrees very closely with the observation made by Leven.[1] According to his report in the findings of the Committee on the Costs of Medical Care, the median remuneration of all salaried physicians in the United States was $4,213. The median salary for 107 full-time heads in the official group of this study was $4,214, and in the nonofficial group the figure for 17 full-time heads was $4,500.

Fifty per cent of the full-time administrators in the nonofficial group were nurses, with a median salary of $2,015. This was approximately $550 more than that paid to nurses serving as administrators in the official group. Lay persons served as full-time heads in 124 agencies. In official agencies the median salary of the full-time group was $1,632 and in the nonofficial group of agencies, approximately $1,906. Those administrators with training classed as "other professional" constituted the minority in both groups of agencies; however, it is noticeable that

TABLE V

Median Salary and Interquartile Salary Range for Full- and Part-time Administrative Heads of Official and Nonofficial Health Agencies in 94 Counties According to the Professional Training of Administrators

Administrative Heads of Official and Nonofficial Agencies	Number of Administrative Heads		Salary Paid to Each Type of Administrator			
			Median		Range of the Middle 50 Per cent	
	Full-time	Part-time	Full-time	Part-time	Full-time	Part-time
Official						
Physicians	107	390	$4,214	$343	$3,205-$5,683	$163-$927
Registered nurses	80	29	1,450	456	1,184- 1,716	206- 719
Other professional persons	47	28	3,410	333	2,469- 5,412	138- 630
Laymen	69	256	1,632	98	1,125- 2,475	31- 208
Nonofficial						
Physicians	17	19	4,500	1,550	3,524- 6,438	488- 4,083
Registered nurses	103	12	2,015	750	1,505- 2,831	350- 1,250
Other professional persons	30	6	2,250	1,050	1,650- 3,525	775- 2,500
Laymen	55	6	1,906	1,000	1,172- 2,891	925- 1,013

the median salary of such heads was higher in the official than in the nonofficial group. Full-time heads with other professional training received a median salary of about $3,410 in official agencies as compared with about $2,250 in the nonofficial.

Over 90 per cent of the part-time administrators of official agencies were either physicians or lay persons. In contrasting the two, the salary range of the middle 50 per cent for physicians was distinctly higher than that for the laymen, since 25 per cent of the latter received less than $31 per year for their services. Although only 43 nonofficial agencies were directed by part-time heads, the analysis did not show the same predominance of physicians and lay persons.

In summary, it may be said that herein are presented data pertaining to opportunities for employment in 1,861 local public health agencies, including both official and nonofficial organizations. With few exceptions, this is a complete coverage of remunerative positions in 94 counties. From these data one cannot draw conclusions regarding the nation as a whole since the study counties represent the more populous areas where organization for public health is above the average. This analysis reveals, however, that more than one-third of all agencies studied consisted simply of lone health officers, nearly all of whom served on a part-time basis. Furthermore, in the agencies which engaged more than one person, one-third of the employees also served on a part-time basis. A higher percentage of personnel employed by nonofficial agencies than by official were classified as part-time employees.

Nearly one-half of the 12,574 full-time personnel employed by the 1,861 health agencies under discussion were nurses. Employees designated "all others" ranked next to nurses in number. This category is composed chiefly of clerical personnel, although a relatively small number of engineers, bacteriologists, chemists, and statisticians are also included. In both official and nonofficial agencies physicians and dentists were more frequently employed for part-time service than for full-time.

The average salary paid to full-time personnel by all classes of health agencies was as follows for the various types of employees: staff physicians, $2,881; clinic physicians, $1,636; dentists, $1,961; inspectors, $1,915; nurses, $1,484; and all others, $1,472. Salaries varied according to the administration of the agency. Some part-time administrators donated their services; this practice was more frequently followed in nonofficial agencies than in official. Physicians received higher salaries than administrators of any other type in both nonofficial and governmental agencies. In general, both full- and part-time administrators drew higher salaries in nonofficial agencies than in official.

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Trichinelliasis in San Francisco*

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SINCE the perfection of newer methods of diagnosis, trichinelliasis in the United States has attracted wide attention. It has been stated that from 5 to 30 per cent of the population has been found to carry trichinellae. The public health officer must consider these figures with some degree of skepticism. Serologic and digestion methods enable the investigator today to detect not only clinical trichinelliasis, but also the so-called zoölogical trichinelliasis. The latter comprises about 75 per cent of all cases, a few trichinellae being found, which may be quite insignificant from the standpoint of public health. The figures in all likelihood are the result of more perfected methods, and not those of an increase in actual clinical infections. Furthermore, results are available as to infections in cadavers, and this method of investigation necessarily cannot discriminate between infections of several years' standing, but must include all infections which may have occurred, perhaps without symptomatology.

What health officers need is that a diagnosis be made during the onset of the disease and the case promptly reported, so that the source may be found and further infections prevented. The figures obtained by such methods would be considerably lower, and would probably not differ greatly from those of early investigators.

The responsibility of avoiding trichinelliasis is placed by the regulations of the meat inspection laws to a great extent on the consumer. Cases continue to occur in San Francisco, showing that the existing policy is not without danger. Difficulties may arise through violations of the existing laws by producers and lack of care on the part of consumers.

In civilized countries, trichinelliasis in man is connected with the consumption of pork food products carrying viable parasites. Other sources, such as bear, wild hog, badger, dog-meat, can usually be avoided. Some countries have tried to prevent infections in man by examination of every hog slaughtered. In the United States, this has been tested, but abandoned as impracticable. If trichinelliasis in pigs could be prevented, there would seemingly be no trichinelliasis in man. How market hogs become infested and how this may be prevented has interested the San Francisco Department of Public Health since 1934. This paper deals partly with such efforts and the conclusions resulting from the investigations.

Many of these conclusions have been admirably expressed by Hall.[1] The senior author, Hobmaier, had reached identical conclusions in July, 1936.

* Summary of Investigations 1934–1938.

Likewise, McNaught and Anderson [2] have reported on their investigations in San Francisco.

From 1927 to 1937, inclusive, there have been reported 212 cases of trichinelliasis in San Francisco, with 6 deaths. The largest number reported was in 1930, 54 cases, and 1 death; and in 1937, 9 cases and 1 death, the latter being the smallest number since 1927. In an analysis of the alleged causative food products, 51 were due to pork roasts and chops, 40 to pork sausages, mainly of the variety served at cocktail parties, 42 to salami, 9 to pickled pork, 9 to mettwurst, and 1 to bear meat. There has not been a case traced to salami manufactured commercially in San Francisco since the promulgation of stringent regulations by the Department of Public Health in 1934.

Only 16 specimens of the suspected pork or pork products were obtained for laboratory examination, and only 4 were proved positive. This shows how difficult it is to obtain the suspected food for investigation. When pork or pork products are blamed for cases or outbreaks, it is rare, despite efficient health organization, to secure evidence other than epidemiologic. Of the human cases, the laboratory diagnosis was made from muscle tissue on autopsy in 6, by skin test in 8, and by eosinophilia in 88.

The trichinella is a parasite of a great variety of hosts, among which, and of especial interest here, are those living in close relationship to man; namely, the pig, rat, cat, and dog. The rat only has preserved the natural cycle of propagation of trichinella from rat to rat without obligatory introduction of the parasite from outside. The main outside sources for infections in rats are pork and pork food products, the remote source being infected cats or dogs. In man, the trichinella has no means of propagating, and in the cat or dog it occurs rarely. Trichinellae in man, cat, and dog, therefore, are dead ends in the life cycle. It is possible for rats to feed on carcasses of cats and dogs killed on highways by automobiles. The valuable assistance given by the Humane Society for Prevention of Cruelty to Animals of San Francisco in eradication of trichinelliasis by the safe destruction of thousands of dogs and cats each year deserves special mention.

The natural cycle of trichinelliasis from pig to pig has been ordinarily interrupted, because pigs are unlikely to feed on carcasses of other pigs. The possibility of transfer of trichinellae in pigs by feeding on infected feces seems to be quite remote, and placental infections apparently do not occur.[3] The original cycle, however, may be reestablished where infected pork and pork products are fed to pigs. It is possible that where this condition exists the feeding on infected rats is a secondary source, and still more remote is the possibility of infections by feeding on carcasses of infected cats or dogs. Moreover, on premises where infected pork or pork products are fed to hogs, the rats are likely to show a high incidence of trichinellae.

In 1935, there were examined for trichinellae 2,000 rats trapped in San Francisco: *Rattus alexandrinus*, 147, with 1 rat infected; *Mus rattus*, 237, 3 infections; and *Mus norwegicus*, 1,616, 125 infections. The distribution of the trichinella cases among the rats is shown in Table I.

TABLE I

Weight Grams	*Rats Investigated*	*Infected Specimens*	*Percentage of Infection*
Up to 50	104	0	0
100	438	3	0.7
150	206	2	1.0
200	159	8	5.0
250	142	11	7.7
300	129	19	14.7
350	155	22	14.2
400	125	24	19.2
450	91	15	16.5
500 and more	67	21	31.3

The figures in the table were obtained by microscopic examination of the diaphragms of the rats. Of the 129 infected rats 57 were males and 72 females.

The percentage of infections was 6.4. Young rats weighing 150 gm. or less showed 0.7 per cent of infections; middle-aged rats weighing up to 250 gm., 6.3 per cent; full-grown rats weighing over 250 gm., 17.8 per cent. The number and severity of infections increased with weight and age, and may be the result of continued exposure to new infections. In 6 specimens, there were found encysted and blood trichinellae; in 4, young trichinellae and those showing beginning calcification; and in 8, intestinal trichinelliasis combined with muscular trichinelliasis. Among 5 rats partially consumed in traps, one showed encysted trichinellae.

The infected rats were trapped as follows:

Markets	44	Dwellings	6
Abattoirs	36	Apartment houses	6
Stables	11	Vacant lots	7
Groceries	3	Miscellaneous places of unknown nature	8
Warehouse	1		
Restaurant	1		
Hotels	2		

Many other places were investigated, but the rats were found free from infection. The disease seems to be restricted to certain foci where infected food is available. Trichinellae infected rats living in city limits are, of course, no direct menace to public health, provided there are no hog ranches, or that hogs are not maintained in abattoirs for a considerable time. They are a valuable indicator that trichinellae infected pork or pork products are improperly handled, whereby the rat infested premises may become foci of infections. There is no doubt that improper storage of food and carelessness in garbage disposal are sources of rat infestation.

Another focus of infection is represented in uncontrolled garbage dumps. Infections may result not only from unsafe human food contained in the garbage and from predatory habits of rats, but also from infected rats trapped in city limits and thrown into the garbage can. Among 161 rats investigated from one of these sources outside of San Francisco, 11.8 per cent were found infected. This is another illustration that garbage disposal of cities has to be carefully supervised.

TABLE II

Examination of Rats Trapped on Hog Farms

Hog Ranch	*Rats Investigated*	*Infected Rats*	*Percentage of Infections*
1	170	55	32.3
2	46	15	32.6
3	30	6	20.
4	158	54	34.1
5	62	12	19.3
6	189	52	27.5
7	105	36	34.3
8	17	5	29.4
9	34	8	23.5
10	20	2	10.
11	12	3	25.
12	6	2	33.3
13	24	3	12.5
14	6	1	16.6
15	7	2	28.5
16	6	1	16.6

The results of the examination of rats trapped on hog ranches which feed garbage is of interest as shown in Table II.

These data show 257 (or 28.8 per cent) infected out of 892 rats examined. Trichinelliasis is to be expected in hogs on these ranches. Some information has already accumulated in this regard.

Garbage feeding causes trichinelliasis only in so far as it contains raw or undercooked pork. Infections may be few or even absent when garbage from establishments where great economy is exercised in utilizing foodstuffs is fed. Severe infections may be expected where meat scraps are abundant, as in the garbage of meat markets.

Ten groups, 201 hogs, from 6 to 12 months old, have been investigated.

Fifteen to 20 gm. of muscle tissue of the pillar of the diaphragm have been treated by the digestion-filter, or by a modification of this method. No dead trichinellae have been found.

RESULTS OF EXAMINATION

1. Two pigs raised on garbage dump land. Both pigs infected, one showing 11.1; one, 0.8 trichinellae per gm. of diaphragm.

2. Twenty-nine pigs from a hog ranch near San Francisco feeding garbage from hotels and restaurants of San Francisco, and from three hospitals. Three pigs slightly infected; number of trichinellae 0.5, 0.7, and 1.3 per gm. respectively.

3. Thirty-five pigs from a hog ranch in San Francisco, feeding garbage from hotels, restaurants and from one hospital of San Francisco. Mild infections in 4 pigs: 0.2, 0.4, 0.9, and 1.6 trichinellae per gm.

4. Sixteen pigs from a hog ranch in San Francisco. Source of food, garbage from hotels and restaurants. Two mild cases of infections: 1.2 and 2.8 trichinellae per gm.

5. Seven pigs from a garbage feeding hog ranch near San Francisco. Two pigs were mildly infected: 1.5 and 0.3 trichinellae per gm.

6. Three pigs from a hog ranch near San Francisco. Source of food, garbage from hotels and restaurants, no infections.

7. Twelve pigs from an adjacent county ranch; food sources unknown, no infections.

8. Seventeen pigs from an adjacent county ranch; food sources unknown, no infections.

9. Seventy-nine pigs from the State of Idaho; food sources unknown, no infections.

10. The most severe infection has been observed recently in a hog from a garbage feeding ranch within the city limits. In 1 gm. of pork of pillar of diaphragm were present 1,238 trichinellae; in the muscle at the base of the tongue, 1,643; and in the muscle under the scapula, 144. Home-made salami sausages contained enormous quantities of trichinellae easily demonstrable microscopically. None of them, however, were found alive by digestion and in feeding experiments.

Some information was secured in investigations of breakfast sausages by the digestion-filter method.[4] The pork used in the manufacture of these sausages came from 20 agencies. Sausages of 5 of these (or 25 per cent) contained viable trichinellae. Examinations repeated over a longer time would, of course, have increased this number.

Another method, based on similar principles, proved to be very useful. After digestion over night in the ordinary way, the jar is covered with 4 layers of gauze and carefully placed upside down in a funnel filled with tap water. A short piece of rubber tubing of approximately the same lumen as the stem of the funnel is slipped over the stem and closed by a clamp. After 2 hours the living trichinellae have accumulated above the clamp and are drawn off.

It is interesting to note the incidence of trichinellae in cats. The examination of 500 cats showed 54 (or 10.8 per cent) infected. The use of the digestion method is more desirable in examination of cats (and in dogs) than in other animals, because the cysts are irregularly distributed, and the slight infestations which occur may be undetected by ordinary methods. The gravity of infections generally increased with the age and size of the animals. Kittens up to the age of 6 or 7 months were found practically free.

This survey shows trichinellae quite common in certain animals in and near San Francisco, indicating definite sources from which cases of trichinelliasis may originate in man and animals.

CONTROL OF TRICHINELLIASIS *

A relative protection of the population against trichinelliasis is provided under the regulations of the meat inspection of the U. S. Department of Agriculture, Regulation 18, 4:

Inasmuch as it can not certainly be determined, by any present known method of

* The essential points outlined in this part of the paper in regard to origin and control of trichinelliasis were contained in a report to the Director of Public Health, San Francisco, dated from July 8, 1936.

inspection, whether the muscle tissue of pork contains trichinae, and inasmuch as live trichinae are dangerous to health, no article of any kind prepared customarily to be eaten without cooking shall contain any muscle tissue of pork unless the pork has been subjected to a temperature sufficient to destroy all live trichinae, or other treatment prescribed by the Chief of the bureau.

The consequences of this policy are summarized in leaflet No. 34 of the Department of Agriculture,[5] as follows:

In the final analysis the prevention of trichinosis is a personal responsibility and involves the thorough cooking of all pork. Pork of kinds customarily eaten without cooking are also dangerous unless it is definitely known that such products were prepared in a plant operating under federal meat inspection or equally thorough state or local supervision.

In detail, this policy expresses:

1. Uncooked pork is unsafe, regardless of whether it has been inspected by federal, state or city meat inspection. It has to be made safe by thorough cooking.

2. Pork food products customarily eaten without some cooking (such as pork sausages, for instance) are unsafe, regardless of whether they have been manufactured under federal, state or city meat inspection. They have to be made safe by thorough cooking.

3. Pork food products customarily eaten without cooking are safe, if they have been manufactured in a plant operating under federal, state, or city meat inspection with adequate regulations. No further preparation is required.

4. Pork food products customarily eaten without cooking are unsafe if they have been manufactured in a plant operating without regulations adequate to insure safety.

The prevention of trichinelliasis, therefore, is a personal responsibility and involves the thorough cooking of all pork, especially as in Groups 1 and 2 above. Among 35 clinical cases of trichinelliasis observed in Boston, Spink and Augustine[6] found only 3 which were caused by raw pork; 15 resulted from eating cooked pork sausages; 9 from boiled ham; 6 from cooked pork chops; 1 from fried ham; and 1 from cooked spare-ribs. An attempt was made in all but 3 cases to render the pork safe by cooking, but was unsuccessful.

Ninety-nine cases of trichinelliasis in man in San Francisco resulted from consumption of undercooked breakfast pork sausages, chops, and roast; 60 from products customarily eaten without cooking.

The mistake is generally made of cooking pork or pork products inadequately. Some products, such as fried pork sausages, may lose flavor and appearance when cooked ordinarily to destroy suspected trichinellae. The National Live Stock and Meat Board says in one of its leaflets: "The flavor of pork is in the fat; therefore, pork should always be cooked at low temperatures as a high heat melts the fat and the lean is likely to be dry." Considering the low melting point of pork-fat, this is true, but this advice to use a low temperature in preparing pork favors undercooking and, consequently, outbreaks of trichinelliasis. Pork-fat has a low gravity. Pork sausages boiled in water are only partially submerged, usually because they contain a large quantity of fat. Thus, it may easily happen that trichinellae in the submerged portion may be destroyed, while those above the water-line may remain alive.

There is no regulation that breakfast sausages must be free from viable trichinellae; the responsibility rests on the consumer. It would appear logical that manufacturers prepare breakfast sausages only from pork proved to be free from viable trichinellae.

Further technical appliances should be worked out and provided for use in public eating places and homes to insure that pork or pork products be raised to 130° F., if safety against trichinelliasis is to be obtained. A false feeling of security is produced by the declaration, "Federal inspected pork," or "prepared from federal inspected pork." The public is not aware that

Government inspected pork (Groups 1 and 2) is unsafe, so far as trichinelliasis is concerned. It is well to advise the public to cook pork thoroughly, but still more important how to do it.

The second part of the policy: "pork of kinds customarily eaten without cooking is also dangerous unless it is definitely known that such products have been prepared in a plant operating under federal meat inspection or equally thorough state or local supervision," refers to the pork in Groups 3 and 4. It is again left to the consumer to decide whether the product is safe. Products of Group 3 are marked with the official markings of inspection. These signs in the case of salami and mettwurst are of doubtful value to the consumer. The markings are made by authorities for authorities, and not, as it justly should be, by the authorities for the information of the buyer. The official markings of each pork food product of Group 3 should show for the buyer the words, "Guaranteed safe 'Meat Inspection. . . .'"

This would permit the purchaser to distinguish safe products of Group 3. As long as pork products of Groups 3 and 4 are found on the market, supervision of those to be eaten without cooking is necessary in the interest of safety.

So far as such products not customarily eaten without cooking are concerned (Groups 1 and 2), local authorities have today no right to interfere. Education in schools, especially in cooking schools, specific regulations in regard to eating places, and the provision of mechanical safety devices for safe cooking seem to be at present the only means of reducing danger of infections. So far as breakfast sausages (Group 2) are concerned, the urgent need to change this policy has already been emphasized.

There have occurred in San Francisco an approximately equal number of cases of trichinelliasis caused by consumption of so-called "Hamburgers." Some benefit probably would result if all meat markets were to sell ground pork and ground beef or Hamburgers separately, and not (as some do at the present time) mixtures of these; and if Hamburgers sold in public eating places were required to consist of ground beef only.

A great number of cases of trichinelliasis have been registered following consumption of mettwurst, salami, boiled ham, and pickled pork. Existing laws should prevent trichinelliasis from such sources.

The policy of the Meat Inspection law is very definite in its purpose. It provides safe products where the consumer cannot protect himself. It frees the manufacturer of pork food products from obligations where self-protection is attainable. It fails where unchallenged infractions of the law occur on the part of pork producing agencies, and where the public fails to provide self-protection. The prevalence of trichinellae in our daily food and the occurrence of clinical cases would show higher figures than have been reported, except for the provisions of the food law. The following calculation illustrates this point: In San Francisco, there are annually slaughtered about 500,000 pigs. It may be assumed that only 2 per cent of them carry viable trichinellae. If each pig furnishes 100 meals, the imposing number of 1,000,000 trichinellae infested meals are served annually.

It is not the Meat Inspection law which has to undergo fundamental changes, but the hog raising industry. Trichinellae infections of pigs are caused by man-made conditions. Pigs kept exclusively on a vegetable diet are not liable to contract trichinellae. The majority of all pigs raised in the State of California are kept on a grain-

vegetable diet and, so far, such vegetarian fed hogs are free from trichinelliasis. The sources are found in the smaller group of hogs fed on a mixed diet of vegetables and raw or partially cooked meat, including pork, in so-called garbage.

The drive against trichinelliasis in the United States is mainly conducted by cities. Around these, piggeries are being operated, attracted by abundant, excellent, and relatively cheap food supplies. Offal from meat factories, slaughter-houses, scraps from food stores, hotels, first-grade garbage of restaurants, hospitals, military camps, institutions, garbage of railroads, and so on, are collected and utilized without further preparation in these piggeries. This offal probably includes raw pork in varying quantities. Pigs fed with this type of food become infected with trichinellae. Pork and pork food products manufactured from these animals are, in turn, responsible for infection in man. *The main source of trichinelliasis in the United States is the communities themselves offering unsafe foodstuffs for feeding pigs and failing to provide proper regulations to make this dangerous food safe.*

This mistake in policy, made on a large scale in cities, is repeated on a smaller scale in smaller communities. Wherever pigs are fed with scraps of raw pork or pork products, the danger of trichinelliasis in man becomes imminent. Since the days of Zenker, it has been emphasized that trichinelliasis is the result of the incorrect feeding of pigs.

This theory seems to give too little consideration to the rôle of rats in the propagation of the disease. Rats share in the cycle of transmission of trichinellae only in a more passive way. They become victims of the same infected food that is responsible for infection in pigs and in man. The tabulations in this report make such conclusion inevitable. There is, of course, no possible place for rats as vectors and passive transmitters of trichinelliasis to pigs on hog ranches. Each infected rat represents a potential source of trichinelliasis for about 3 consecutive years.

The likelihood of transmission of trichinelliasis to hogs by feeding on carcasses of dogs and cats is undisputed. There has been argument as to whether feces of infected hogs may transmit the disease to other hogs. We feel justified in assuming that no spread of infections by feces is possible from the 3rd day after intake of the infected food. Dogs and cats discharge great numbers of trichinella larvae, seemingly unaltered and undeveloped the 1st, and possibly the 2nd day in the course of the turbulent reaction of the intestine accompanying heavy invasion of the parasite. Possibility of transmission to hogs during the short period of time is quite likely. The justification of keeping dogs and cats on hog ranches for the destruction of rodents is therefore upset by the possible danger of transmission of trichinelliasis to pigs. Rat eradication on hog ranches must not depend on dogs and cats, but on more effective poisoning.

It is not justifiable for departments of health to take over the burden of investigation of every pig in regard to trichinella infection, as by the serologic reactions advocated by Augustine and Spink.[6] It is contended that the provision of the Meat Inspection law adjusted by the few regulations and suggestions named above, combined with sanitary management of hog ranches, provides sufficient means of dealing effectively with the present trichinella situation. In reality, sanitation of the hog ranches, strictly enforced, would make all other regulations superfluous. Some day, as fore-

shadowed in Hall's [1] summary of the situation, this may become the universal policy. At present the situation is complicated, since only a minor portion of the pork supply of a great community is derived from sources under control.

So far as San Francisco is concerned, trichinella conditions are aggravated by allowing food scraps carrying viable trichinellae to be collected in city limits to serve as hog food, without further preparation on hog ranches. Realizing that in so doing, trichinelliasis is artificially propagated in pigs, to be in turn reintroduced into man, this condition can no longer be tolerated. It will become necessary to license the use of city garbage as hog food and to grant licenses only if guarantees are given that no unsafe food is used in these piggeries. To make garbage safe, sterilization of that intended for hogs seems to be required. It was unfortunate that promising negotiations conducted in 1937 between the San Francisco Department of Public Health and the agencies involved have been terminated by labor strikes. Executive Order Number 209, March 15, 1938, solves this problem. Another solution of the question would be the establishment of municipal piggeries, such as some cities have built up, in order to make garbage disposal profitable.[7] The plant could operate in the beginning with garbage of institutions made safe by proper procedures. Later on at least part of the first-grade garbage of private institutions would be added voluntarily, if the profit of the municipal piggery were used to sustain humanitarian institutions.

Pork from pigs raised on such a piggery would be free from trichinellae, and this could be made certain by adequate inspection. Pork of this type does not at present exist on the American market.

The hog industry should become fully conscious that hog raising and pork producing are not exclusively private enterprises, but that they impose certain obligations in the interest of public health, as it is already acknowledged under similar circumstances in the dairy industry. Pork food producing agencies should try everything to provide a "healthful, wholesome, and safe meat supply" (California Meat Inspection law, section 2), an assurance not fulfilled, so far as trichinelliasis is concerned.

Other Executive Orders issued by the San Francisco Department of Public Health for protection against trichinelliasis are as follows: Executive Orders Nos. 215 and 216, April 2, 1938; and Executive Order Number 217, April 19, 1938.

Zoölogical gardens are an uncommon, but nevertheless occasionally important, source of trichinelliasis. Since San Francisco has such an institution, we mention briefly some general rules:

1. Feeding of raw pork, even scraps of it, in garbage, and of raw dog or cat meat, should be carefully avoided.
2. Carcasses of animals of the zoo, and especially those of flesh-eating animals, should not be buried or used as food for other animals, but should be incinerated.
3. Utilization of the meat of any flesh eating animal, and particularly of bear or badger, for human consumption makes special investigation for absence of trichinellae indispensable.
4. Methods of rat control as used on hog ranches.

SUMMARY

The relative protection intended by the Meat Inspection law against trichinelliasis in man has to be made more effective and, in addition, the spread of trichinelliasis to pigs prevented by the following means:

1. *Sanitation in management of hog ranches:*
   a. Licensing garbage feeding under the provisions of rendering garbage safe by technical methods.

b. Extermination of rats (ratproof buildings, poisoning).

c. Freeing of hog ranches from cats and dogs.

2. *Trade regulations:*

a. Exclusion of pork food products of Group 4 from the market.

b. Breakfast sausages should be manufactured from safe pork.

c. Limited trichinella inspection for manufactured pork food products is desirable.

d. Safe products should carry declaration: Guaranteed Safe, Meat Inspection of Department of Public Health.

e. Labels: "Prepared from . . . inspected meat" are not advisable on products of Group 2.

f. Clearly visible inscription on sales of pork: *Cook Pork Thoroughly.*

3. *Education of consumer:*

a. In regard to occurrence of trichinellae in food and dangers of raw or undercooked pork and pork food products.

b. How to avoid undercooking.

4. *Instructions to personnel of eating places—similar to those for consumers:*

Mechanical safety devices.

Hamburgers are to be made from beef only.

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An Epidemic of Typhoid Fever Attributed to Salad Contaminated by a Chronic Typhoid Carrier

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EACH of 3 cases of typhoid fever reported during the third week of June, 1937, in individuals rather widely separated as to residence was investigated independently by the health agency * in whose jurisdiction the case occurred. The New York State Department of Health was notified of the occurrence and result of investigation of each case. Study of the reports revealed the common factor that all 3 individuals had attended a luncheon served on Memorial Day by a fraternal organization in Schenectady.

An immediate survey of recent admissions to Schenectady hospitals was undertaken and disclosed 2 additional cases of illness characterized by continued fever which were suspected of being typhoid fever, the diagnosis of which was subsequently confirmed by laboratory evidence. Both individuals had attended the luncheon on Memorial Day.

The almost simultaneous occurrence of 5 cases of typhoid fever in residents or visitors to Schenectady was a definitely unusual prevalence of the disease, the average annual number of cases in Schenectady for 1932–1936 being 2. The fact that all 5 had attended the Memorial Day luncheon strongly suggested an etiological relationship of some factor connected with the luncheon. A detailed investigation was undertaken jointly by the Schenectady City Department of Health and the New York State Department of Health.

CLINICAL INVESTIGATION

The names and addresses of persons who attended the luncheon were obtained, and each individual was visited by a member of the medical staff of the State Department of Health. In all, 33 persons attended the luncheon and 2 were discovered who did not attend but who ate food brought home from this function. All but 2 of the 35 were interviewed. If the questioning revealed symptoms suspicious of typhoid fever, 3 fecal specimens and one or more of blood were obtained for laboratory examination. In the absence of symptoms a single fecal specimen was secured. Three fecal specimens were obtained from all persons known to have supplied or prepared food for the luncheon.

During the investigation 4 new cases were reported and 4 hitherto unknown cases were discovered, making 13 cases among those who attended the luncheon. The Widal was positive in all 13 cases.

* Schenectady City Department of Health, New York State Department of Health District Office, and Massachusetts State Department of Health.

One patient died before a fecal specimen was obtained; typhoid bacilli were isolated from the feces of 9 of the 12 cases from whom specimens were secured. Typhoid bacilli were cultured from the blood of one patient who had negative fecal cultures. Of the total number, 9 were residents of Schenectady and 4 were non-residents. In addition to the 13 clinical cases, 2 subclinical cases or passive typhoid carriers were detected. A positive Widal and positive fecal cultures were obtained from both individuals, although there was no history of previous typhoid fever and neither exhibited the symptoms nor physical signs of the disease. That the carrier condition in these two was of temporary duration was demonstrated by repeated bacteriological studies. A positive Widal was reported in one individual who gave no history of previous typhoid fever or vaccine and who suffered no symptoms of the disease; repeated fecal cultures were negative. With the exception of this person, positive Widal tests were not found in other than the clinical cases and temporary passive carriers of typhoid bacilli.

None of the individuals interviewed had ever received typhoid vaccine. Two gave a history of previous typhoid fever; neither became ill and the laboratory examinations were negative.

CLINICAL CHARACTERISTICS

The clinical course was prolonged and severe in 6 cases, and 1 death occurred; a girl aged 16 years. The other cases were relatively mild; in fact, 4 were not recognized prior to the epidemiological investigation as having typhoid fever. In addition to these 13 clinically recognizable infections, there were the 2 sub-clinical cases or temporary passive carriers, and the 1 individual with a positive Widal, who have been described above.

Three of the 13 cases became chronic carriers, women, aged 44, 53, and 65, respectively. Each has been found to excrete typhoid bacilli in the feces over a period of more than a year following the illness.

INCUBATION PERIOD

The interval between the luncheon and the onset of symptoms varied from 5 to 28 days. The peak incidence was reached on the 7th day, when 5 cases occurred; the median case fell on the 9th day. The chronological distribution of cases is shown in Table I.

FOOD SOURCE

Detailed information was obtained as to the various foods eaten by each individual who attended the luncheon. Table II lists the foods, and shows the consumption of each type by the 15 infected and by the 17 who did not show evidence of infection. Potato salad, macaroni salad, buttered rolls, and coffee were the only foods eaten by more than 5 of the patients.

Of the home prepared foods, 2 persons each supplied one dish of potato salad; 1 person provided two dishes of potato salad, and 1 of macaroni salad; 4 cakes were contributed by different persons; 1 person supplied cabbage

TABLE I

Incubation Period of 13 Clinical Cases of Typhoid Fever Occurring Among Persons Having a Single Exposure to Food Contaminated by a Chronic Typhoid Carrier

Number of Days Following the Luncheon	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	Total
Number of Cases					1		5		2		1					1		1							1			1	13

TABLE II

Infection According to Foods Eaten at Luncheon

	Fifteen Infected Persons			*Seventeen Persons Not Infected*					
Type of Food	*Number Eating*	*Number Not Eating*	*Doubtful*	*Number Eating*	*Number Not Eating*	*Doubtful*	*Number Known to Have Eaten*	*Number Infected*	*Infection Rate Among Those Eating*
Macaroni Salad	11	3	1	4	11	2	15	11	73
Potato Salad	12	1	2	14	3	0	26	12	46
Buttered Rolls	13	2	0	15	2	0	28	13	46
Coffee	11	4	0	15	2	0	26	11	42
Baked Beans	5	10	0	11	6	0	16	5	31
Summer Sausage	5	10	0	4	13	0	9	5	55
Pickles	5	9	1	6	11	0	11	5	45
Cabbage Salad	4	9	2	5	11	1	9	4	44
Spiced Ham	4	11	0	4	13	0	8	4	50
White Cake	4	11	0	5	12	0	9	4	44
Chocolate Cake	4	11	0	8	9	0	12	4	33

salad; a dish of baked beans was furnished by another, and a jar of pickles was provided by one. The remaining articles—tinned evaporated milk, coffee, sugar, butter, rolls, and cold sliced meats—were purchased from various stores in Schenectady.

Serving spoons were placed in the dishes contributed and each guest helped himself. The only food prepared at the church was the rolls, which were buttered just before the luncheon. Of the 5 women who did this, 4, all of whom were well at the time, subsequently developed typhoid fever; the 5th gave no history of previous typhoid fever; her Widal was negative; and 3 fecal cultures on successive days were negative.

Four of the 10 persons who prepared food at home developed typhoid fever subsequent to the luncheon. The date of onset could be fixed with a considerable degree of certainty in each—first symptoms appeared from 5 to 11 days after the luncheon.

Two of the 6 persons who prepared food and who did not contract typhoid fever gave a history of previous typhoid fever; 3 or more negative fecal cultures were obtained from each. Of the 4 who prepared food but did not develop the disease and who gave no history of previous typhoid fever, 3 each submitted 3 or more negative fecal specimens. *B. typhosus* was isolated from the feces of the remaining individual on 12 different occasions over 3 months following the luncheon.

The individual with positive fecal cultures, M. T., a woman 65 years of age, denied having had clinically recognized typhoid fever at any time.* She recalled, however, that about 40 years previously, her sister suffered from a disease which was probably typhoid fever, and that, although she was living in the same household, she herself did not become ill. For the past 10 or 15 years, M. T. had suffered symptoms which might be ascribed to chronic cholecystitis. She had never had children, her occupation had never involved the preparation of food for others, and there was no history of her ever having given rise to a case of typhoid fever previous to this epidemic.

Despite the finding of typhoid bacilli in many fecal specimens submitted at intervals over 3 months, and a negative Widal reaction on the 43rd day following the luncheon, the possibility that

* Twenty per cent of known chronic typhoid carriers in New York State deny previous history of typhoid fever.

M. T. was not a typhoid carrier prior to the luncheon but had developed sub-clinical typhoid and the carrier condition subsequent to the luncheon might be raised were it not for the epidemiological evidence incriminating her.

On the evening of May 30, M. T. peeled and boiled potatoes which were set aside until the following day. Early in the morning of the day of the luncheon, the potatoes prepared the previous evening, and a dish of macaroni boiled the same morning, were cut up, celery and a prepared mayonnaise dressing were added, and the ingredients stirred and mixed with the fingers. Two dishes of potato salad and one of macaroni salad were set aside for several hours at room temperature, and shortly before noon taken to the church parlors to be served at the luncheon. A small amount of each salad was left at home for the evening meal.

This was the only macaroni salad served at the luncheon. Eleven of the 15 persons known to have been infected (either clinical cases or passive carriers) gave a definite history of having eaten this salad; one other patient stated she had probably eaten it. Two of the four dishes of potato salad were prepared by M. T. Twelve of the 15 infected persons stated definitely they had eaten potato salad, and 2 others stated they had probably eaten of it. Altogether, 14 of the 15 gave a definite history of having eaten potato salad or macaroni salad, or both; the remaining patient felt it was very probable she had eaten of both.

At the conclusion of the luncheon, some of the potato salad prepared by M. T. remained, was taken home by one of the women present, and served to her son and niece. The son developed typhoid fever on June 25, but the niece was apparently not affected. A young man who rented a room in the home of M. T. attended the luncheon but denied having eaten either potato or macaroni salad, preferring baked beans, as did the majority of men attending. However, in the evening of the day of the luncheon, he ate in the home of M. T. a portion of the salads which had been left at home since morning. On the basis of a positive blood agglutination test and the presence of typhoid bacilli in a fecal specimen submitted July 4, he has been considered a temporary passive typhoid carrier; several fecal cultures subsequent to that of July 4 have been negative. The remainder of the salad left at home was eaten by M. T. and her husband. The latter suffered from "grippe" and vague intestinal symptoms for 2 or 3 days about 2 weeks after the meal; fecal culture was negative 34 days later, and the Widal test, made 45 days after the meal, was negative.

The fact that macaroni salad prepared by M. T. was eaten by at least 10 of the typhoid fever patients; that potato salad was eaten by at least 11 of the 13, and that M. T. prepared two of the four dishes of potato salad; that 12 and probably all 13 of the patients ate potato salad, macaroni salad, or both; that 2 of the patients ate M. T.'s salad elsewhere than at the luncheon; and that repeated fecal cultures submitted by M. T. over 3 months have contained typhoid bacilli makes it extremely probable that, even in the absence of a history of previous typhoid fever, she was a chronic typhoid carrier and the source of the outbreak. The vehicle of infection was potato salad and macaroni salad prepared by the carrier.

SUMMARY AND CONCLUSIONS

1. Three cases of typhoid fever in individuals rather widely separated as to resi-

dence were reported by 3 different health departments to the New York State Department of Health. Prompt reporting, followed by epidemiological investigation, made possible the early recognition of an outbreak of typhoid fever and the institution of steps to detect the source and prevent its spread. The importance of prompt reporting by physicians and health officers of what may seem to be individual and apparently isolated cases is illustrated by this outbreak.

2. Thirteen clinical cases of typhoid fever were found to have occurred among 35 persons who had eaten food prepared for a community meal to which articles were contributed by 10 different persons.

3. In addition to the 13 clinical cases, 2 temporary passive carriers of typhoid bacilli were detected by routine laboratory examination. An additional person was found to have a positive Widal in the absence of symptoms and history of typhoid fever or vaccine; fecal cultures were negative.

4. Three of the clinical cases were found to have passed from the acute stage into the chronic typhoid carrier condition. All 3 continue to excrete typhoid bacilli for more than a year after the onset of typhoid fever.

5. No secondary cases occurred as a result of the epidemic.

6. Detailed epidemiological studies identified the vehicle of infection as macaroni and potato salads, and the source as a previously unrecognized chronic fecal typhoid carrier.

Yellow Fever in Brazil

AS to the general situation in regard to yellow fever in South America the observations of the last 3 months show in a striking way the importance of jungle fever as a public hygienic problem of the first order. An enormous area covering parts of the States of Minas Geraes and Rio-de-Janeiro have been infected during this year (1938). The value of viscerotomy has been again shown. All of the early cases of the present epidemic have been discovered by viscerotomy, although many of the physicians of this region were familiar with the literature concerning jungle fever.

The present outbreak in the States of Minas Geraes, Rio-de-Janeiro, and Sao Paulo have been associated as have been those in recent years in Brazil with a high mortality in howler monkeys. This observation has been confirmed by the discovery of dead monkeys in the forest. The result of many thousands of protection tests with the serum of wild animals begun in 1934, confirm the opinion that the various varieties of monkeys are the most important vertebrates in the dissemination of the jungle virus. The collection of insects in the many infected zones also confirm the idea that several species of mosquitoes are the active vectors of the virus when most of the human cases are produced. However, it has not yet been possible to determine the method by which the virus is concerned from season to season in the south of Brazil where each year a number of months pass without a single human case being observed.—F. L. Soper, *Month. Bull.*, Office International d'Hygiène Publique, June, 1938, p. 1205.

Dye Concentration in Culture Media Employed for the Analysis of Escherichia-Aerobacter Members in Milk*

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RECENT investigations [1] have indicated that one of the limiting factors in tests to determine the presence of *Escherichia-Aerobacter* members in milk has been the culture media employed. In most instances the concentration of the bacteriostatic agents in these media was developed for use in water analysis. Assuming the possibility of most of the dyes used as bacteriostatic agents being adsorbed on the milk solids, leaving only a fraction of the original concentration free for inhibitory purposes, studies were undertaken to determine a more desirable dye concentration for culture media employed in the detection of the *Escherichia-Aerobacter* group of organisms in milk.†

In view of the earlier results obtained in this laboratory [1] which indicated that fuchsin lactose broth, brilliant green lactose bile broth 2.0 per cent, and methylene blue brom cresol purple broth were equally efficient in the detection of *Escherichia-Aerobacter* members in milk, the media selected for this study were fuchsin lactose broth and brilliant green lactose bile broth 2.0 per cent. The third medium was omitted because of its relative complexity.

Standard Methods of Water Analysis [2] recommends a concentration of 1 part of 95 per cent basic fuchsin dye in 66,666 parts of lactose broth. In this study it was verified that an increase in the basic fuchsin dye content above that recommended was inhibitory to the growth of aqueous suspensions of colon group members. However, skim milk suspensions of the same organisms were not inhibited by a basic fuchsin ‡ dye concentration of 1 part in 13,300 of lactose broth.

These results with skim milk failed to take into consideration the possibility of dye being adsorbed on the fat globules of whole milk. Further studies were undertaken, therefore, employing whole milk of varying percentages of fat and serum solids, to determine the concentration of dye necessary in the

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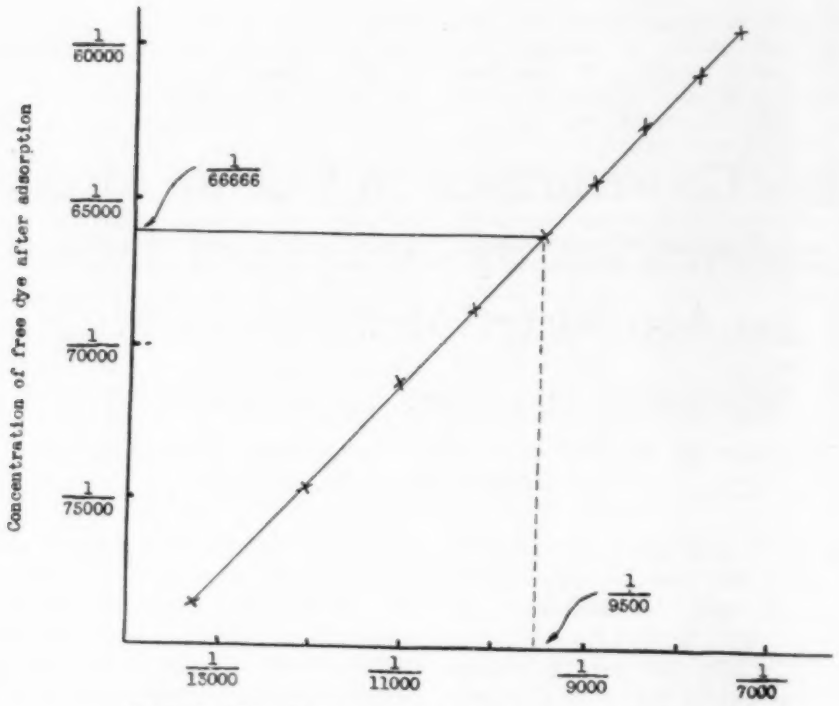
† Studies not here reported show that Gram-positive organisms multiply readily in these media with their present dye content in the presence of the organic materials of whole milk.

‡ The dye content of the basic fuchsin and brilliant green dyes employed in this study was 85 and 95 per cent respectively and was approved as satisfactory by the Commission on Standardization of Biological Stains.



Concentration of basic fuchsin dye in 10 ml. of medium to which 1.0 ml. quantities of milk were added.

Figure I

presence of whole milk which would permit a free dye concentration of 1 part in 66,666, as recommended by *Standard Methods of Water Analysis*.[2]

Whole milk containing 4.0 per cent fat and 8.0 per cent serum solids was added to lots of lactose broth of varying dye content in a ratio of 1 part milk to 10 of the medium. The concentration of free dye present after adsorption was determined by placing the mixture inside a semi-permeable membrane and allowing the dye to dialize for 48 hours at 37° C. into a standard medium containing 1 part dye in 66,666 parts of lactose broth. A free dye concentration less than the standard resulted in a movement of dye inward and decreased the dye concentration outside of the membrane. Conversely a concentration greater than the standard resulted in an increased concentration of dye outside of the membrane. Only when the free dye concentration of the milk and medium mixture was equal to the standard of 1 part in 66,666 was there no change in the concentration of dye outside of the membrane.*

Figure I shows that, as the concentration of dye mixed with the milk was increased, the concentration of free dye after adsorption also increased to plot as a straight line. When the concentration of dye in the medium mixed with the milk was increased to 1 part in 9,500 (see broken line), the free dye content was approximately 1 part

* All dye concentrations after dialysis were determined colorimetrically.

in 66,666 as noted by the horizontal line. In order to have a free dye concentration of 1 part in 66,666 as recommended [2] in the presence of whole milk, 4.0 per cent fat and 8.0 per cent serum solids, it is necessary to have a concentration of 1 part in 9,500 in the medium before adding the milk.

Similar studies were conducted employing a milk abnormally high in organic matter, 6.0 per cent fat and 12.0 per cent serum solids. It was found necessary to increase the dye concentration to 1 part in 8,250 to give a free dye concentration at 1 part in 66,666. Conversely a low solids milk 3.0 per cent fat and 6.0 per cent serum solids required a dye concentration of only 1 part in 14,800.

Standard Methods of Milk Analysis [3] recommends the use of brilliant green lactose bile broth 2.0 per cent as a presumptive medium in the detection of *Escherichia-Aerobacter* members in milk. The concentration of brilliant green is the same as recommended by *Standard Methods of Water Analysis*,[2] 1 part of certified brilliant green in 75,188 parts of lactose bile broth 2.0 per cent. The optimum concentration of brilliant green in brilliant green lactose bile broth 2.0 per cent for use in detecting *Escherichia-Aerobacter* members in milk was determined by dialysis as previously described. Results indicate that a concentration of 1 part of brilliant green in 30,000 is necessary in the medium to obtain the recommended concentration in 75,188 for bacteriostatic action in the presence of whole milk solids, 4.0 per cent fat and 8.0 per cent serum solids.

A comparison was then made to observe the relative efficiency of 4 culture media in the detection of *Escherichia-Aerobacter* members in the presence of whole milk solids. Two of these media contained the concentration of dye recommended in *Standard Methods* and in the remaining 2 the concentration that was found in this study to be more favorable. These media are:

1. Fuchsin lactose broth, 1 part basic fuchsin in 66,666
2. Fuchsin lactose broth, 1 part basic fuchsin in 9,500
3. Brilliant green lactose bile broth 2.0 per cent, 1 part brilliant green in 75,188
4. Brilliant green lactose bile broth 2.0 per cent, 1 part brilliant green in 30,000.

These media were inoculated with 5 pure cultures of the colon group suspended in coli-free whole milk in various dilutions. Five tubes of each medium were inoculated with 1 ml. of each dilution of each culture. The tubes were incubated 48 hours and positive tubes recorded on the basis of gas production. The medium containing 1 part basic fuchsin in 66,666 gave 154 positive tubes, while the medium with 1 part in 9,500 gave 161, showing that the increased concentration of dye gives a more efficient medium. Both 1 part in 75,188 and 1 part in 30,000 brilliant green gave 155 positive tubes, indicating that the increased concentration is just as efficient for *Escherichia-Aerobacter* members as the lower.

To determine the relative efficiency of the 4 media in inhibiting false presumptive organisms in the presence of whole milk solids, the same procedure was followed, using 2 cultures of the genus Bacillus capable of fermenting lactose with the production of gas. In this case, 1 part in 66,666 basic fuchsin gave 52 positive tubes, while 1 part in 9,500 gave only 6 positive tubes and 34 with small bubbles, showing that the increased concentration of basic fuchsin is more inhibitive to these microorganisms which are responsible for false presumptive tests. One part in 75,000 brilliant green gave 2 positive tubes and 18 showing small bubbles, while 1 part in 30,000 gave no positive tubes and no bubbles, again showing the increased dye concentration to be

more inhibitive to these Gram-positive lactose fermenting organisms.

The ability of these 4 media to serve as selective media in the detection of *Escherichia-Aerobacter* organisms in milk samples containing several types of bacteria was studied by inoculating them with 70 milk samples collected at a local receiving station. Five tubes of each medium were inoculated with 1 ml. portions of milk and positive tubes confirmed with regard to the presence of *Escherichia-Aerobacter* members by employing eosine-methylene-blue and making the "completed test" in accordance with "Standard Methods Procedure." [2]

The medium containing 1 part in 9,500 basic fuchsin when used as a presumptive medium showed that 53 of the 70 samples contained *Escherichia-Aerobacter* members, all of which were confirmed and found positive on completion. The medium containing the lower concentration of basic fuchsin, 1 part in 66,666, revealed only 43 of the 53 positive samples as containing colon group members. The brilliant green lactose bile broth 2.0 per cent medium with 1 part in 75,188 brilliant green detected only 46 samples showing *Escherichia-Aerobacter* members, compared to the medium containing 1 part in 30,000 brilliant green, which showed 51 positive samples. These results indicate that the increased concentrations of dye are more sensitive in detecting *Escherichia-Aerobacter* members in milk.

The higher concentrations of basic fuchsin and brilliant green in no case permitted the growth of false presumptive microörganisms. However, with both dyes the lower concentrations showed gas from 5 samples, which could not be confirmed as being positive on completion; again indicating that the increased concentration of dye is more effective in inhibiting the growth of non-colon group microörganisms.

DISCUSSION

The results obtained in this study indicate that in the employment of these "Presumptive Tests" media for the detection of *Escherichia-Aerobacter* members in milk, the milk solids adsorb a considerable amount of the dye present. The proportion of dye in these two media was originally determined by incorporating the (greatest) maximum dye content to serve as a bacteriostatic agent for Gram-positive bacteria which at the same time would not inhibit the growth of Gram-negative organisms. In the case of fuchsin lactose broth the maximum amount of dye which could be incorporated was 1 part in 66,666. These studies show that when 1 ml. portions of whole milk (4.0 per cent fat, 12.0 per cent total solids) were added to fuchsin lactose broth, the dye concentration could be increased approximately *7 times* to a concentration of 1 part in 9,500 without inhibiting the growth of colon group members. In a similar manner it was demonstrated that the content of brilliant green in brilliant green lactose bile broth 2.0 per cent could be increased approximately *2½ times*, or from a concentration of 1 part in 75,188 to 1 part in 30,000.

As a result of the adsorption of fuchsin dye upon the milk solids there is less dye present to act as an inhibitory agent and Gram-positive organisms multiply readily in fuchsin lactose broth with its present dye content. Previous studies (1) indicated that these 2 culture media when used for the detection of *Escherichia-Aerobacter* members in milk gave 20 per cent of false presumptive tests. The present study, employing pure cultures of bacteria as well as 70 milk samples, shows that by increasing the dye content in these 2 media the false presumptive tests are largely eliminated without lessening the selective properties of these media for the *Escherichia-Aerobacter* group.

SUMMARY

1. The addition of 1 ml. portions of milk to fuchsin lactose broth and brilliant green lactose bile broth 2.0 per cent adsorbed a considerable amount of the dyes present, thereby lessening the selective action of these media in the detection of the *Escherichia-Aerobacter* group of organisms in milk.

2. To obtain the proper amount of free dye so that these culture media can serve in a selective capacity it is necessary that the content of basic fuchsin in fuchsin lactose broth be increased approximately 7 times, from 1 part in 66,666 to 1 part in 9,500, and the content of brilliant green dye in brilliant green lactose bile broth 2.0 per cent be increased approximately 2½ times from 1 part in 75,188 to 1 part in 30,000.

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Medical Research in Canada

SCIENCE announces that a survey of existing facilities for medical research in Canada is to be made under the auspices of the Committee on Medical Research, established in March, 1938, by the National Research Council. Sir Frederick Banting is chairman of the committee and will personally conduct the survey.

Among other members of the committee are those with special interest in public health including Dr. R. E. Wodehouse, Deputy Minister, Department of Pensions and National Health, Ottawa, and Dr. A. Grant Fleming, Dean of the Faculty of Medicine and Professor of Public Health, McGill University, Montreal.

Bovine Mastitis

The Relation of Streptococci to Physical Changes Occurring in the Udders of Dairy Cows

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THE anatomical changes which develop in the bovine udder as a result of mastitis offer one of the most satisfactory means available at the present time of determining whether the organ is diseased and how far the disease has progressed. When mastitis has been present in a quarter for even a relatively short time the character of the udder tissue becomes appreciably altered. The changes which are found on clinical examination of a diseased quarter may be either in the form of distinct firm nodules or diffuse thickening of the glandular tissue. The lesion in either case represents an invasion of the normal secreting tissue by connective or scar tissue following inflammation of the gland. If the mastitis is only transient in nature, the proliferative process becomes static, but the indurations remain as a permanent record of the attack. Unfortunately, the majority of the cases of mastitis are caused by bacterial invasion, and as a rule the infection establishes itself permanently in the udder. In this event, the disease tends to progress with varying degrees of rapidity from the original site of localization, usually the cistern, to the rest of the quarter. Induration of the glandular tissue accompanies this progression until in many cases there is practically a complete replacement of the secreting tissue by scar tissue.

In view of the permanence of the changes which occur as a result of mastitis and its accessibility for examination, palpation of the empty udder affords an easy and accurate means of detection of the disease. Some of the possibilities inherent in this method have been recognized in the past by a number of authors [15] and Udall and Johnson [20] have observed that "the value of a physical examination in diagnosis (of mastitis) rates above any other single method." That the milk from udders which are definitely indurated is usually changed in composition as shown by other tests; such as pH, chlorine, catalase and leucocyte count, has been observed in the course of mastitis investigations in this laboratory and this fact has also been reported by Hucker and Udall.[19] On the other hand, when milk samples from these udders are examined bacteriologically, bacteria which are not customarily associated with mastitis are not infrequently found. Also a few udders have been encountered which appear to be entirely normal on palpation and are harboring mastitis streptococci.

As a result of the rather extensive investigation of mastitis by a number of workers in the past, a number of species of bacteria have been described as the causative agents of the disease. It is fairly well agreed at the present time, however, that the streptococci are of chief importance in this respect and that one definite species, *Streptococcus agalactiae*, is found in a high percentage of the cases of this type of mastitis. The incidence frequently reported for this species has been around 90 per cent.[8, 17] Several species of streptococci comprise the remaining 10 per cent, but probably because of their relatively infrequent occurrence, the information concerning them is somewhat limited. Other species of cocci, more particularly staphylococci are also found in some cases of mastitis, but comparatively little knowledge is available relative to their importance in the disease. More recently however, reports [5, 6, 11, 12, 18] have appeared which indicate an increasing interest in this phase of the problem. The remaining bacterial species, consisting principally of bacilli, such as coliform types, *Corynebacterium pyogenes*, and others, are of minor importance probably because of the sporadic character of their occurrence. It is worthy of note in this connection that the changes induced by these various agents in the udder and the milk are very similar.

The object of this work therefore was to compare the physical condition of the udders of infected and uninfected cows in herds in which mastitis streptococci were present and also to compare the udders of cows in streptococcus-free herds with these animals. In addition an attempt was made to identify the species of streptococcus in each animal so infected. Several different types of herds in the vicinity of Beltsville, Md., were included in the investigation which was started in the fall of 1936. Three of these herds, numbers 1, 2, and 9 (Tables II and V) are maintained to supply fluid milk to institutions. Two other herds, numbers 3 and 5, are used principally for experimentation in breeding and feeding problems of dairy cattle. The remaining four herds, numbers 4, 6, 7, and 8, are privately owned and are subject to health department supervision. In addition to milk production, herd number 4 is used for breeding pure bred cattle.

PROCEDURE

Composite samples of milk were collected from each animal immediately before milking. The ends of the teats were washed thoroughly with a pledget of cotton, moistened with a 1 in 1,000 solution of bichloride of mercury in 50 per cent alcohol. Several streams of milk were discarded from each quarter and then as equal amounts as possible were drawn from the four quarters into a sterile screw top specimen vial, holding about 20 c.c. When the samples were brought to the laboratory, part of the milk was immediately tested by the Hotis method,[9] and the remainder was incubated for 24 hours at 37° C. in the original container. At the end of this time, the results of the Hotis test were noted and smears made from the incubated milk for microscopic examination. In addition a large loopful (4 mm. loop) of incubated milk was spread over the surface of a blood agar plate (5 per cent horse blood) which had been prepared previously. The plates were incubated for 24 hours at 37° C., and the colonies which resembled streptococci were picked into 10 per cent serum (horse) bouillon. These cultures were examined microscopically for purity following incubation and then seeded in differential culture media.

One-tenth c.c. of culture was added to each of the following media: litmus milk, methylene blue milk (1 in

10,000), lactose, salicin, mannite, trehalose, sorbitol, aesculin, and sodium hippurate. The media for the fermentation tests were made by adding 1 per cent of the carbohydrate to extract broth together with 10 per cent serum (horse) and Andrade's indicator. The solution was adjusted to pH 7.4, sterilized by filtration, and tubed in 2 c.c. amounts. Each medium was incubated for 48 hours at 37° C., to test for sterility. The sodium hippurate medium was prepared according to the pepsin-peptone formula recommended by Ayers and Rupp.[1] Ability to split aesculin was determined by the method described by Weatherall and Dible.[21] The reactions of the streptococci in these test substances were recorded after 5 days' incubation at 37° C. All of those cultures which failed to give typical reactions for *S. agalactiae* (group A, Table I) were tested a second time after an interval of several months as a check on the results noted at the time of isolation.

Each udder was examined clinically as soon as possible after it had been milked out. Classification of the udders follows the plan described by Udall and Johnson[20] in so far as the physical condition of the organ is concerned. The brom-thymol-blue test was not used and the previous history of the animal was not considered. In this classification, a cow is placed in Class 1 when all quarters are entirely normal and free of indurations. When one or more quarters have some slight change in the consistence of the glandular tissue which may be in the form of a minimum diffuse or nodular thickening, usually in the lower part of the gland, the cow is placed in Class 2. If one or more quarters of the udder contain distinct indurated

TABLE I

Types of Streptococci Isolated from Milk Samples Collected in 5 Streptococcus-infected Herds

Culture	Litmus Milk A	Litmus Milk C	Litmus Milk R	M.B. Milk* C	M.B. Milk* R	Lactose	Salicin	Mannite	Aesculin	Sodium Hippurate	Herd Number 1	2	3	4	5	Total Cultures
				Trehalose +						Sorbitol —						
A	+	+	P or —	—	—	+	+ or —	—	—	+	21	105	41	24	0	191
B	+	—	—	—	+	+	—	+	+	+	1	1	0	0	0	2
C	+	+	P	+	+	+	+	+	+	+ or —	3	2	0	0	0	5
				Trehalose +						Sorbitol +						
D	+	+	S or —	+	+	+	+	+	+	+	16	1	2	0	0	19
E	+	+ or —	+ or —	+ or —	+ or —	+	+	+ or —	—	+	6	2	1	4	1	14
F	+	—	—	+ or —	P or —	+	—	—	—	+	6	0	0	0	0	6
				Trehalose —						Sorbitol —						
G	+	+	S or —	—	—	+	+	S or —	—	+	32	0	0	0	7	39

* Methylene blue milk
+ = Positive
A = Acid
P = Partial
R = Reduction
S = Slight
C = Coagulation
— = Negative

areas either diffuse or as nodules, but with a considerable part of the glandular tissue remaining intact, the cow is classed as number 3. A cow is considered to be in Class 4 when a major portion of the secreting tissue has been replaced by connective or scar tissue.

RESULTS

A total of 629 lactating cows in 9 dairy herds have been examined in the course of this investigation. Streptococcic mastitis was found in 5 herds, containing 547 animals (Table II) while no streptococci were detected in the remaining 4 herds with 82 cows (Table V). The number of cows found to be excreting streptococci with the milk by one or more of the tests was 298, or 47.4 per cent of all animals examined. This result is more or less comparable to those reported by other authors.[15] The highest incidence of infection occurred in the largest herds, numbers 1 and 2, with percentages of 63.1 and 61.0 respectively (Table II), while the lowest percentage, aside from herds which were completely free and which might be considered in another category, was 32.0 in herd 5 with only 25 animals. Herds 3 and 4 had been found to have a somewhat larger number of animals infected at the time of previous examinations, but owing to disposal of older animals and their replacement with heifers, the incidence of infection has been materially reduced, particularly in Herd 4.

Of the 298 samples (Table II) in which streptococci were detected by one or more of the tests, cultures were recovered from 276, or 90.2 per cent. The different types of streptococci which were isolated have been divided into three large groups (Table I) on the basis of their action on sorbitol and trehalose [2] and these groups further sub-divided with respect to the results in the other media employed. As a consequence, 7 more or less distinct types have been formed. Because of certain differences in the composition and kinds of media used, it is somewhat difficult to compare the results of other authors in connection with the bacteriology of the streptococci. However, there can be relatively little doubt that Group A in Table I is *S. agalactiae* which has been described under that name by some authors [7, 10] and Group 1 A [16] and Group 1 [4] by others. On the other hand, the similarity of the remaining strains found in this work with those reported elsewhere is not as

TABLE II

Incidence of Streptococcus Agalactiae and Other Types of Streptococci in 5 Dairy Herds

Herd Number	*Number of Milking Cows in Herd*	*Number of Streptococcus Infected Cows*	*Per cent of Streptococcus Infected Cows*	*Number of Cows Carrying S. agalactiae*[5]	*Per cent of Cows Carrying S. agalactiae*	*Number of Cows Carrying Other Types of Streptococci*[1]	*Per Cent of Infected Cows Carrying Other Types of Streptococci*
1	141	89[1]	63.1	53	62.3	32	37.7
2	190	116[2]	61.0	105	94.4	6	5.6
3	88	44	50.0	41	93.2	3	6.8
4[6]	103	41[3]	39.8	24	85.7	4	14.3
5	25	8	32.0	7	87.5	1	12.5
Totals	547	298	54.5	230	82.6	46	16.9

1. Streptococci were not isolated from 4 samples of milk.
2. " " " " " 5 " " " ".
3. " " " " " 13 " " " ".
4. 7 strains of this group typical of *S. agalactiae* other than fermentation of both trehalose and sorbitol.
5. 39 strains failed to ferment trehalose.
6. Large percentage of first-calf heifers.

clear. As far as can be determined, Groups B, C, and F have not been reported in other publications dealing with this subject. Group D appears similar in many respects to *S. uberis* described by Diernhofer[3] which is listed as Group 3 in the classification of Plastridge and his associates.[16] Group E likewise may be said to resemble Group III of Edwards.[4] Failure by Group G strains to acidify trehalose is the only cultural difference between them and Group A. Inasmuch as approximately half of the cultures in Group G showed definite evidence of fermentation of trehalose when tested a second time several months after isolation, some question might be raised concerning their inclusion in a separate group rather than placing them in Group A. The irregularity of trehalose fermentation has also been noted by Plastridge *et al.*[16] who have, however, given similar strains a separate classification. It will be observed in Table I that Group G strains have been found in but 2 of the 5 infected herds, numbers 1 and 5 (Table I). In the former, 56.1 per cent of the streptococcus cultures isolated belonged in this group, whereas in the latter herd all but one animal were found to be carrying this strain. In Table II, animals carrying Group G streptococci have been included with those carrying typical *S. agalactiae* or Group A types for convenience in tabulation.

The results of physical examination of the udders of 617 cows appear in Table III. Twelve additional animals were not examined because of too recent freshening and an accompanying edema of the udder which rendered the organ unsuitable for palpation. The figures presented in Table III are instructive with respect to the influence of streptococci on the udder and also as to the condition of the udders of cows which are not so infected. Although the total number of animals in each group is approximately equal, 2.4 per cent of the infected animals had udders in which no indurations were found and were placed in Class 1 while 11.6 per cent of the uninfected animals fell in this class, a difference of almost 5 to 1. There were 18.2 per cent of the infected animals in Class 2 and 29.4 per cent of uninfected animals which is a ratio of not quite 2 to 1. No significant difference was apparent between the percentage of animals in the two groups found to be in Class 3, although a slight advantage was noted for the uninfected group. In Class 4, however, the difference is considerable in that 24.7 per cent of the infected cows showed marked physical evidence of mastitis in one or more quarters as contrasted with 9.2 per cent for the uninfected group, or about two and one-half times as many. The fact that the percentage of cows in the two groups not infected with streptococci is nearly the same in all 4 classes would appear to emphasize the damaging

TABLE III

Summary of Average Results of Classification of Udders of Cows in the Several Herds by Physical Examination

Group	Total Number of Cows	Class 1		Class 2		Class 3		Class 4	
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Streptococcus-infected cows	291	7	2.4	53	18.2	159	54.6	72	24.7
Uninfected cows in all herds	326	38	11.6	96	29.4	162	49.7	30	9.2
Uninfected cows in streptococcus-infected herds	244	28	11.5	74	30.3	120	49.1	22	9.0
Cows in streptococcus-free herds	82	10	12.3	22	26.8	42	51.2	8	9.7
All cows examined	617	45	7.3	149	24.1	321	52.0	102	16.5

TABLE IV

Classification of Udders of Cows in Streptococcus-Infected Herds by Physical Examination

Herd Number	Number of Milking Cows in Herd	Class 1		Class 2		Class 3		Class 4	
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
1	136 [1]	8	5.9	31	22.8	81	59.5	16	11.7
2	183 [2]	17	9.3	33	18.0	89	48.7	44	24.0
3	88	6	6.8	26	29.5	39	44.3	17	19.3
4	103	2	1.9	31	30.0	55	53.4	15	14.5
5	25	3	12.0	5	20.0	16	64.0	1	4.0
Totals	535	36	6.7	126	23.5	280	52.3	93	17.4

1. Five additional cows not palpated
2. Seven additional cows not palpated

effect of these organisms and may also possibly indicate some other common cause for the fibrosis present in non-streptococcus udders.

The physical condition of the udders found in the different herds is shown in Tables IV and V. Although there is considerable variation in this respect in both groups, it will be noted that when individual herds are considered, the uninfected ones do not show the amount of change in the udders found in those which are affected with streptococcic mastitis. It should also be pointed out that the largest number of Class 4 cows occurred in Herd 2 which was also found to have the highest incidence of infection with *S. agalactiae*, 94.4 per cent (Table II), and that as the number of animals carrying these streptococci decreases in the first 4 herds, the number of cows in Class 4 becomes smaller. Under the circumstances, it would appear that this result, although interesting, may be more or less coincidental since the percentages in the other classes do not support it.

Because of the comparatively small number of animals in the 4 herds in which streptococci were not found, considerable fluctuation appears in the individual herd percentages. Inasmuch as no definite cause could be determined for the changes present in these herds, it may be possible that local conditions were of considerable influence in this matter. In Herd 9, as an example, several animals with udders showing marked evidence of mastitis and also carrying streptococci had been eliminated several years prior to this survey and replacements made with first-calf heifers from the herd. However, the percentages for these herds are in fairly close agreement with the uninfected cows (Group B, Table VI) in the infected herds. In Table VI, the physical condition of the udders in the infected (A) and uninfected (B) groups in the same herd are compared.

TABLE V

Classification of Udders of Cows in Streptococcus-free Herds by Physical Examination

Herd Number	Number of Milking Cows in Herd	Class 1		Class 2		Class 3		Class 4	
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
6	17	2	11.8	5	29.4	9	52.9	1	5.9
7	34	4	11.8	11	32.4	14	41.2	5	14.6
8	8	0	0.0	2	25.0	5	62.5	1	12.5
9	23	4	17.4	4	17.4	14	60.8	1	4.4
Totals	82	10	12.3	22	26.8	42	51.2	8	9.7

TABLE VI

Comparative Results of the Classification of Udders of Infected and Uninfected Cows in Streptococcus-infected Herds*

Herd Number	Group	Total No. of Cows	Class 1		Class 2		Class 3		Class 4	
			No. of Cows	Per cent	No. of Cows	Per cent	No. of Cows	Per cent	No. of Cows	Per cent
1	A	86 [1]	2	2.3	17	19.8	54	62.8	13	15.6
	B	50 [2]	6	12.0	14	28.0	27	54.0	3	6.0
2	A	112 [3]	4	3.6	18	16.1	53	47.3	37	33.0
	B	71 [4]	7	16.9	16	22.7	35	49.2	8	11.2
3	A	44	1	2.3	11	25.0	20	45.4	12	27.2
	B	44	5	11.5	15	34.0	19	43.1	5	11.5
4	A	41	0	0.0	6	14.8	25	60.9	10	24.3
	B	62	2	3.2	25	40.3	30	48.4	5	8.1
5	A	8	0	0.0	1	12.5	7	87.0	0	0.0
	B	17	3	17.6	4	23.5	9	52.9	1	5.9

A = Infected animals B = Uninfected animals

* Cows included from which streptococci were not isolated

1. 3 additional cows not palpated
2. 2 additional cows not palpated
3. 4 additional cows not palpated.
4. 3 additional cows not palpated

Since all of the animals in each herd are maintained under the some conditions the results in this table are of considerable significance. The percentage of uninfected cows in Classes 1 and 2 is uniformly higher by a large margin, while the number of streptococcus-infected cows in Class 4 is two to three times that of the uninfected animals. It may be possible that the somewhat closer agreement between the uninfected animals in the different herds with regard to class percentage may be attributed to the larger numbers in each herd.

DISCUSSION

The results of the bacteriological study of milk samples in this investigation agree fairly well with the reports of other workers.[15] Figures somewhat higher than the 47.4 per cent infection with streptococci have been found in some cases while in others the percentage has been lower. Also the number of cows, 83.3 per cent carrying *S. agalactiae* in one or more quarters approaches the previously mentioned figure of 90.0 per cent. This slightly lower percentage is due to the findings in one herd (number 1, Table II). If this herd is not considered, the percentage becomes 92.6. A number of types of streptococci were encountered in Herd 1, Table I, most of which have been described by other authors. The type of streptococcus most prevalent in this herd, however, resembled *S. agalactiae* in all respects with the exception of its failure to act on trehalose (Group G, Table I). This same variety was also practically the only one present in Herd 5 (Table I). Although it seems probable that these streptococci may be *S. agalactiae* or closely related to it, it is of interest to note that the percentage of cows with Class 4 udders in these herds is appreciably smaller than in those herds having a high percentage of cows infected with typical *S. agalactiae*.

Very few figures are available with which the results of the clinical examination of the udder can be directly

compared. It is therefore not known whether the figures of 7.3 per cent, Class 1, or normal udders; 24.1 per cent, Class 2, or slightly indurated udders; 52 per cent, Class 3, or distinctly indurated udders; and 16.5 per cent, Class 4, or udders with marked induration would be approximated in an examination of an equal number of cows elsewhere. In connection with the percentage of Class 4 animals, however, some figures reported by the Bureau of Animal Industry [13, 14] several years ago are of interest. At this time 235,354 milk cows were examined for marked physical evidence of mastitis, and 28,439, or 12.0 per cent, were removed on this account, while 4,760 additional cows were regarded as being suspicious. In the milk shed of one of the larger cites, 64,041 cows were examined and 9,027, or 14.1 per cent, were found to have marked physical cases of mastitis. In view of these results it would appear that the percentage of cows in Class 4 found here could hardly be considered abnormally high. If a similar agreement should extend to the other three classifications, then it might be said that roughly 10 per cent of the cows in milk production have normal udders, 25 per cent have reasonably good udders, while 50 per cent show definite evidence of mastitis, and finally 15 per cent or 1 out of every 6.5 animals are no longer suitable for dairy purposes.

That the streptococci are responsible for the larger portion of the indurations found in these udders seems to be clearly demonstrated by this work, but it is also equally evident that even if the streptococci were eliminated a certain amount of mastitis would still be present in the herd. These same facts are also of importance with regard to the value of clinical examination of the udder in the detection of mastitis. Cows which have or have had mastitis, irrespective of the cause, for any appreciable length of time can be detected by this method with remarkable consistency, and in addition this method is extremely useful in selecting animals which should be removed from the herd on account of badly diseased udders.

SUMMARY

Milk samples from 629 cows in 9 dairy herds were examined by 3 bacteriological methods for the presence of streptococci. The 3 methods used were the Hotis test, microscopic examination of incubated milk, and culture of incubated milk on blood agar plates. When streptococci were found on the blood agar plates, they were tested in differential media and placed in groups according to their action on these media.

Streptococci were detected in milk samples from 298, or 47.4 per cent of all animals examined. These animals, however, were present in only 5 herds. No streptococcus infected cows were found in 4 herds with a total of 82 animals. The highest incidence of infection occurred in the largest herds, and the lowest in the smallest of the 5 herds.

Although streptococci were detected in 298 milk samples by the 3 tests, cultures were recovered from 276, or 90.2 per cent. From their action on trehalose and sorbitol, these strains were divided into 3 large groups and further divided into sub-groups on the results on the other media. Seven groups were found. Group A, or *S. agalactiae,* predominated, and when Group G, which differed from it only in the latter's failure to acidify trehalose, is included, formed 83.3 per cent of the cultures isolated. About one-half of the Group G strains fermented trehalose when tested a second time several months later.

The udders of 617 cows were examined by palpation for indurations as

soon as possible after they were milked out. On the basis of physical condition 45, or 7.3 per cent, of the animals were placed in Class 1, or free of indurations; 149, or 24.1 per cent, were in Class 2 with slight indurative changes; 321, or 52.0 per cent, were definitely indurated and placed in Class 3; and 102, or 16.5 per cent, showed marked physical evidence of mastitis, and belonged in Class 4.

There were 291 cows infected with streptococci as compared with 326 in which these organisms could not be detected. Of the infected animals 7, or 2.4 per cent, of the udders were in Class 1, while 38, or 11.6 per cent, of the uninfected cows fell in this group; a difference of about 5 to 1. In Class 2 there were 53, or 18.2 per cent, of infected cows and 96, or 29.4 per cent, of uninfected cows, a ratio of not quite 2 to 1. There was no significant difference in Class 3 between the two groups, but in Class 4 there were 72, or 24.7 per cent, infected cows against 30, or 9.2 per cent, uninfected, or about two and one-half times as many as the former.

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An Inexpensive Method for the Dehydration and Preservation of Complement and Other Biological Materials

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As early as 1896, C. J. Martin [1] suggested the possibility and procedure involved in the preservation of guinea pig complement in the dried state. Noguchi,[2] in 1907, dried complement and amboceptor on filter paper. Shackell,[3] in 1909, dried complement in the frozen state and showed that it could be preserved for months. Karsner and Collins,[4] in 1919, applied Shackell's method for the preservation of various sera and in 1923 Hartley [5] and his associates reported the dehydration of complement by distilling off the H_2O in vacuo. In 1931, Craigie [6] dried complement from the frozen state by means of a vacuum desiccator, and more recently Elser [7] and coworkers showed conclusively that biologicals could be dehydrated from the frozen state. This method was admirably developed by Flosdorf and Mudd [8] and resulted in their dry-ice "Lyophile Apparatus" by means of which complement may be preserved for several months without any detectable deterioration.

The necessity of an inexpensive and simple method involving only apparatus available in the average laboratory led us to the construction of the following device:

The apparatus consists of a High-vac pump, a gallon size aspirator bottle or suction flask, which serves as a trap, and an ordinary vacuum desiccator. Since the success of the desiccating process depends upon a desiccant of great efficiency, porous (granular) barium oxide was selected.[9] It takes up moisture with great rapidity and has no measurable vapor pressure and the fact that it cannot be reactivated is offset by its cheapness and availability. Barium oxide does not become sticky and does not channel if the container is properly filled.

THE PROCEDURE

The apparatus is set up in such a manner that the top of the aspirator bottle is connected to the top of the vacuum desiccator by means of a large glass T tube, 1.2–1.5 cm. in diameter, which is connected to a stopcock and manometer. The lower outlet of the aspirator bottle is attached directly to the pump with a heavy walled rubber connection. The bottom of the desiccator is filled with BaO and an equal amount is placed into the trap bottle. Thirty grams of BaO is sufficient to dry 1 c.c. of fresh serum. It is of im-

portance to increase the surface of the BaO by stratification. Cotton layers may be used. The lower outlet of the trap is filled with cotton to protect the pump. After greasing of all connections with stopcock grease, the sera are frozen in a dry ice bath with alcohol, acetone or kerosene. The vials are dried and placed in the desiccator; the pump is immediately started at full capacity to remove all residual air. By the time the frozen serum has reached the fusion temperature, the air pressure is reduced to such an extent that moisture is taken up by the BaO with sufficient rapidity to maintain the serum in the frozen state. Depending on the quantity of materials used, condition of the desiccant, the period of drying varied from 12 to 18 hours. An important point to note is that in the freezing of complement the thickness of the layer should not exceed 12 mm. Slanting and rotating the vials during freezing is a convenient method to increase the evaporating surface. After the first hour the speed of the pump may be reduced.

When drying is completed, the vacuum is released slowly by way of the stopcock and the vials which contain the dried serum, which is highly hygroscopic, are immediately stoppered with rubber stoppers. For the insertion of the stoppers a small amount of oil (paraffin) may be used. Water should be strictly avoided. The air in the vials is then exhausted through a hypodermic needle attached directly to the High-vac pump. Five minutes suffice to secure vacuum sealing of the vials. Finally, the rubber stoppers are dipped in molten paraffin.

The method has proved to be effective in the drying of virus containing materials and other substances like human milk.

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Tennessee Opens Health Unit Building

A NEW building for the Gibson County health unit, at Trenton, Tenn., was dedicated recently. This building, erected and equipped at a cost of $40,000, was built with the aid of the Commonwealth Fund.

The speakers at the dedication ceremonies included Barry C. Smith, Executive Chairman of the Commonwealth Fund, and Wilson C. Williams, M.D., Tennessee State Health Officer.

Earl P. Bowerman, M.D., is at present Acting Director of this unit, succeeding Frank L. Roberts, M.D.

Educational Qualifications of Sub-Professional Field Personnel in Sanitation*

IN small health units where each of the persons engaged in environmental sanitation must of necessity cover a wide range, the individuals employed should in all cases meet the qualifications set forth for public health engineers or sanitarians. In the larger city and county health agencies having divisions of general, food, milk, and industrial sanitation, the direction of these various branches should likewise be by individuals meeting the qualifications set forth for public health engineers or sanitarians. It is realized that it may be necessary or desirable to employ or to continue to employ non-professional personnel in subordinate positions in the larger city and county health agencies until such time as public health administrators are able to require the higher standards prescribed for the public health engineer and sanitarian grades. The committee recommends:

1. That such sub-professional personnel be given the title of Sanitarian Assistant rather than the title of Sanitary Inspector, Sanitary Officer, or Sanitation Officer.

2. That the education and experience requirements be not less than graduation from high school, and at least 2 years' experience in some line of work that has brought the individual in contact with the general public.

3. That all sub-professional personnel be given in-service training, supplemented by such short course training as may promote proficiency in performing the duties assigned. The aim of these courses should be the equivalent of a 2 year college course.

Graduation from high school or its equivalent and completion of a 2 year course in an institution providing a course of instruction in public health prior to employment is considered the equivalent of 2 and 3.

4. That persons of this sub-professional group not having had instruction or experience in health work should not have passed their 35th birthday at the time of first employment.

W. S. LEATHERS, *Chairman*

* The Committee on Professional Education of the American Public Health Association publishes this progress report to permit the members and Fellows of the American Public Health Association to review it and to offer criticisms and suggestions to the committee in the further consideration of the report.

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THE SIXTY-SEVENTH ANNUAL MEETING

IT is not news to the members of the Association that every year for 66 years a convention has been held which from the earliest days to the present has engaged the attention, thought, and active participation of the best minds in the public health movement. Each year has seen the high-water mark advanced a little. Each year has recorded progress—in research, in technic, in application of scientific principles, in professional solidarity. There have been few Annual Meetings when something has not "broken," as the gentlemen of the press say. Some of those "breaks" have represented the opening of a door and a sudden heretofore unsuspected vista down which many of us have trooped with enthusiasm and profit. Some still remain the first and last word definitely spoken and accepted.

The keynote of the more recent meetings has seemed to some observers to be that of reviewing, evaluating, checking, appraising, and assimilating. The currently popular phrase "refresher course" might be applied with truth. This is all to the good. One takes a deep breath after a long climb, looks around and back to survey what has been traversed. One also pauses on the levels to take stock of his companions and wait for the less fleet to catch up. The consciousness of ourselves as members of a body or a group comes to us in these lulls and we move on at last, never again so unaware of those beside us, above us, and below. Perhaps the reviewing process commented upon, has been responsible for the burgeoning recognition of ourselves as members of a powerful profession.

We approach the 67th Annual Meeting in Kansas City, Mo., October 25–28, in the strongest position as a profession that we have yet occupied. It is well then, with all that lies in the immediate future for public health workers in the way of the new and the untried, that we have had the opportunity to look back over the route we have come and to extract from our experiences and our awareness of each other fresh courage to attack the new heights. That there are new heights just ahead cannot be questioned. This meeting, coming as it does in a year of most significant happenings which have already put more money into public health budgets than ever before in our country's history and which

may soon release more funds than the most sanguine dreamed of even two years ago, may well mark the "ridge of the hill," to borrow Dr. Parran's vivid expression.

From the Association's standpoint this has been a remarkable year. As a natural result of expanding health services, the membership rolls have extended to an unprecedented length. There are 6,100 names on the roster, more than 1,000 added since the last Annual Meeting. We shall find many new faces at the 67th Annual Meeting. The new minds will help formulate the new philosophies whose beginnings may be traced back in later years to Kansas City in 1938.

FOOD POISONING BY STAPHYLOCOCCI

WITH increasing frequency reports are appearing concerning food poisoning by certain strains of the staphylococcus. Recently two unusually extensive outbreaks have occurred, one in the United States [1] and one in Canada.[2]

In May, 1936, there was reported to the State Board of Health of Montana an extensive food poisoning in Billings during which at least 54 persons were seriously affected. Investigations pointed very strongly to a single bakery and to cakes which contained a filling made of flour, eggs, water, and sugar. This was prepared in the bakery twice a week and stored in a mechanical refrigerator. The symptoms in almost all cases developed within 4 or 5 hours after eating the food. There was marked abdominal pain, frequent movements of the bowel—in some cases as many as 20—and vomiting, with severe prostration, but fortunately no deaths. The picture was that of an acute intoxication rather than bacterial infection. Fortunately, the original lot of filling for the orange cream cake which seemed to be the offending article could be obtained and was studied at the State Laboratory. Both the *Staphylococcus aureus* and *albus* were recovered and it seemed evident that both strains were associated with the production of the symptoms.

The second outbreak occurred in Hamilton, Ont., March, 1938, with 21 persons reported as having been poisoned. Investigation showed that custard filled pastry was the only article of food eaten in common which could be considered a possible source of illness. Members of the family who had not eaten the pastry were unaffected. In this outbreak the symptoms usually appeared in from 1½ to 2 hours. They were essentially the same as those described in the Montana outbreak. No deaths occurred. *Staphylococcus aureus* was isolated from the incriminated food as well as raw material used in its preparation and from the utensils used. A number of cultures were sent to the Connaught Laboratories where they were studied with great care. The investigation showed that three strains were practically identical in toxin production and that the cultures isolated from the pastry bag in the bakery were identical with those found in the incriminated food. Cultures of staphylococci from the noses and throats of the employees were easily divided into two distinct groups; one of which had properties very similar to those isolated from the suspected food, while the other produced toxin of much less potency. It seemed reasonable to conclude that the source of the infection was one person who had spread his infection to his fellow employees by whom it was further conveyed to raw materials, utensils and the finished food products. The bakery itself was in a sanitary condition and reasonable care in handling the finished products was

exercised. A point worth observing is that the absence of clinical evidence of a nose or throat infection in an employee was no indication that he was not harboring the microörganism.

In the Montana outbreak one history is perhaps particularly interesting. A woman purchased a layer cake on Saturday and ate of it Sunday evening. She was quite ill for several hours with vomiting and purging. Not suspecting the cake, she put a piece in her husband's lunch box which he ate at his midnight lunch. About 4 hours later he vomited 5 or 6 times, felt chilly, had 6 or 8 movements, and was markedly prostrated. Still not suspecting the cake, the following day this woman again put a piece in her husband's lunch box. This was eaten at the second midnight lunch and 3 hours later he had a recurrence of his illness.

Both of these investigations, one of which was very thorough, have demonstrated that fillings such as that described are one of the chief methods of spreading staphylococcus poisoning. Jordan long ago pointed out that staphylococcus was particularly apt to produce poison when grown on starchy medium.

Investigations[3, 4] on staphylococcic mastitis in cows are important in this connection, since they indicate that this type of mastitis is probably more common than has been believed. Strong evidence of the danger of such infections has been brought forward. Shaughnessy and Grubb, in every outbreak investigated by them, have found cases of staphylococcic mastitis in the herd which supplied the milk. They suggest that the parasitic staphylococci may be more capable of producing an enterotoxin than the saprophytic forms. Here is another argument for the pasteurization of all market milk, though, as in the Hamilton outbreak, it would not have been effective, as the contamination of the food products evidently took place from handlers of the food product.

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NOTE: Experiments with Staphylococcal Enterotoxin, by C. E. Dolman and R. J. Wilson, published in *Journal of Immunology*, July, 1938, p. 13, will be found very interesting by all students of this subject.

DIPHTHERIA IMMUNIZATION

IMMUNIZATION against diphtheria has occupied the attention of scientific men for a number of years. Many of our states have been very active in carrying it out and successful campaigns have borne rich fruit. Great advance was made when Ramon invented his toxoid, the so-called anatoxine. Soon, however, it was shown that toxoid precipitated with alum gave a preparation which was very efficient and that a high degree of immunity could be obtained with a single injection, a tremendous advantage in carrying out immunization on a large scale. In this country perhaps alum precipitated toxoid is still more largely used than any other preparation and is producing good results.

France has lately (June 25, 1938) put the official stamp of approval on immunization against diphtheria, making it compulsory for all children during infancy, that is, in the second or third year of life. The actual law is as follows [1]:

"Antidiphtheria vaccination with l'anatoxine (toxoid) is compulsory during the second or third year of life. The parents or guardians are personally responsible for the carrying out of this measure, proof of which shall be furnished on admission to any school, nursery, vacation colony, or other assembly of children.

During the first year of application of the present article, all children under 14 years of age attending the schools, if they have not yet been vaccinated against diphtheria, shall be subjected to such vaccination.

A public administrative regulation, rendered according to the opinion of the Academy of Medicine and the Consultative Committee on Public Health of France, shall decide the measures necessitated by the application of the preceding provisions."

REFERENCE

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BOOKS AND REPORTS

Life, Heat, and Altitude: Physiological Effects of Hot Climates and Great Heights—*By David Bruce Dill. Cambridge, Mass.: Harvard University Press,* 1938. 211 pp., 27 tables, 25 figs. Price, $2.50.

In the style of swing music, this book presents a succession of variations on the basic theme that every animal physiologic function depends upon the supply of oxygen. Temperature regulation and the rôle of sweat therein; thirst of fish, frog, man, and dog; the breath and the blood of Clarence DeMar or of the Peruvian llama; the reason for prostrations in the early heat waves of our summer; the psychological condition of the crew of a China Clipper in flight to Hong Kong and back, all are shown to possess a common denominator in their relation to oxygen transport by erythrocyte, serum, and lymph, where electrolytes, ions, and water are shifted according to rule and to suit the occasion. Here is no trite recitation of orthodox dogma, but rather a vigorous presentation of personal convictions with supporting evidence, based to a refreshing degree upon the original work of a group of collaborators of the Fatigue Laboratory at Harvard who performed tests upon each other while themselves under stress of desert heat or the anoxemia of altitude, who found time and interest to study the animals they could collect about them in strange places.

Arranged for a series of Lowell Lectures, the material is presumed to be addressed to the non-technically trained, and to any thoughtful reader will be informative. Its appeal to the biologist who is accustomed to the language and the symbols of experimental physiology is assured. The feeling of the reviewer upon reading the volume from cover to cover is that here is physiological literature fresh, reliable, attractive, compounded of virtuosity and convincingness.

Besides technical interest for aviators, travellers, mountain climbers, physicians, physiologists, and biochemists, there is here much of fundamental importance for the student of personal or public hygiene.

JOHN W. M. BUNKER

The Public Assistance Worker—*Edited by Russell H. Kurtz. New York: Russell Sage Foundation,* 1938. 224 pp. Price, $1.00.

This compact volume is as comprehensive a survey of the public assistance field as has yet been written.

In the first chapter Arthur Dunham outlines the development of relief agencies in America and the problems that they face. Donald S. Howard next explains what requirements an applicant for relief must meet and what are the long-time results of his having to do so. Margaret E. Rich continues the discussion of how people are affected by receiving relief, indicating what reaction they may have to the procedures involved in applying for the various types of assistance. Dora Goldstine takes up the problem of maintaining the health of people receiving assistance, pointing out that the adequacy of the aid given has a great deal to do with the physical condition of the recipients and that the social worker can do much to lift the general level of physical well-being among those she comes in contact with if she

knows the danger signals of ill health and the resources there are to call upon.

In conclusion, Gertrude Vaile discusses the relationship of the public assistance worker to her community and Russell H. Kurtz has a chapter on her relationship to the profession of social work.

CATHERINE GROVES PEELE

Practical Physiological Chemistry—*By Philip B. Hawk and Olaf Bergeim (11th ed.). Philadelphia: Blakiston*, 1937. 968 pp. Price, $8.00.

To those unacquainted with this standard work, it may be described as a comprehensive system of biochemical methods interwoven with an interpretive text of principles and facts. It is a veritable storehouse of procedures which maximizes the practical side; yet, through the enviable economy of words its factual content covers the entire field, and in fundamentals achieves exceeding completeness. That was its original design; even now in the eleventh edition it remains unchanged. Since its first appearance this book, while expanding, has been able to accommodate within its original framework the onrush of new topics from the almost cataclysmic developments in the biochemical world. That it has passed through 10 editions in 30 years, retaining its best features to be combined with new material, attests the soundness of this plan.

Truly the task of surveying the ever widening biochemical domain has become herculean; hence, the participation of two collaborators in the preparation of this edition is not unexpected. In it, 12 chapters have been rewritten. Enlisted for certain of them were the services of specialists who have treated their topics with a sureness of one who has been over the ground. The latest technics are explained in detail and every selection draws upon the experience of these qualified investigators. It is through its accuracy and reliability that a method earns its claim to consideration. On these points even critical judgment and discriminatory powers cannot substitute for a working knowledge of a particular method.

In all essentials the book maintains its previous high standards. Its detailed methodology, its concise informative text, and its well selected bibliography still assure it what it has held for so long, an important place in bench-side biochemistry.

H. D. KRUSE

The Chemical Analyses of Foods and Food Products—*By M. B. Jacobs. New York: Van Nostrand*, 1938. 487 pp. Price, $6.00.

The book is a systematic presentation of methods of chemical analyses of foods and food products. The details of methods are supplemented by 65 useful tables and 56 figures.

Following introductory chapters on general methods of analysis are chapters dealing with coloring matters, preservatives and metals in foods and then more detailed methods as applied to milk products, oils and fats, sugars and carbohydrates, and gums, cereals, starch and other polysaccharides. Further chapters deal with jams, jellies, and fruits; spices, flavors and condiments; non-alcoholic beverages; alcoholic beverages; meat, fish, and eggs, and vitamins.

The author has presented short practical methods which are of importance in routine analyses of foods. The methods are up-to-date and well presented and much of the information deals with newer methods difficult for the average worker to obtain otherwise.

The book should be a valuable addition to the library of any food chemist or technologist or any other worker dealing with foods. It should also be helpful as a reference volume or text-

book in teaching or in routine analytical and control laboratories.

CARL S. PEDERSON

Handbook on Social Hygiene—*By W. Bayard Long, M.D., and Jacob A. Goldberg, Ph.D. Philadelphia: Lea & Febiger,* 1938. 442 pp. Price, $4.00.

Here is a timely and authoritative symposium. It furnishes 442 pages of technical guidance and basic philosophy in social hygiene—that field where problems relating to sex are given an airing. It should prove particularly helpful to sanitarians, especially to those among the state, city, and county health officers who have heard and participated in sporadic discussions on "lues" and "Neisserian infections" for many years, but who have accomplished little in the control of syphilis and gonorrhea.

The past 2 years have witnessed the renaissance of efforts designed to control and eventually eliminate the venereal diseases. With the recent passage of the LaFollette-Bulwinkle Bill, the U. S. Public Health Service is in a better position to implement the nation-wide campaign, but, as the editors say, "Limitations of our present medical and institutional facilities; drawbacks of the available drugs, and shortcomings of current chemotherapy; lapses in diagnostic tests and the need for their improvement—these and many other problems are still to be faced from the point of view of diagnosis and treatment."

Far more space than is allotted for this review would be required to evaluate the volume adequately. Therefore the reviewer takes refuge in listing the section headings and authors and letting them tell their own stories:

"The Campaign Against Syphilis and Gonorrhea," by William F. Snow, M.D.; "History and Cutaneous Manifestations of Syphilis," by Howard Fox, M.D., Sc.D.; "The Diagnosis of Syphilis," by W. Bayard Long, M.D.; "The Treatment of Syphilis," by Dr. Long; "Syphilis of the Nervous System," by I. S. Wechsler, M.D.; "The Medical Aspects of Syphilis," by I. Ogden Woodruff, M.D.; "Syphilis and Gonorrhea of the Eye," by Conrad Berens, M.D.; "Prenatal and Congenital Syphilis," by W. Bayard Long, M.D.; "Gonorrhea in the Male," by Howard S. Jeck, M.D.; "Gonorrhea in the Female," by Emily Dunning Barringer, M.D.; "Vaginitis," by Reuel A. Benson, M.D.; "Laboratory Aspects of the Venereal Diseases," by John F. Mahoney, M.D.; "Hospitals and Out-Patient Clinics—Their Organizations and Management in Relation to the Venereal Diseases," by Claude W. Munger, M.D.; "Department of Health Programs for Combating Syphilis and Gonorrhea," by Charles W. Clarke, M.D.; "Statistics Relating to Syphilis and Gonorrhea," by Jacob A. Goldberg, Ph.D.; "Social Service and Epidemiology Relating to Venereal Diseases," by Rosamond W. Goldberg, R.N., Ph.D.; "The Responsibility of Nursing Schools in the Control of Syphilis and Gonorrhea," by Anna D. Wolff, R.N.

"The Public Health Nurses and Syphilis Control," by Amelia H. Grant, R.N.; "The Problems of Syphilis and Gonorrhea in Family Welfare Agencies," by Alta E. Dines, R.N.; "Social Hygiene Education in Relation to Venereal Disease Control," by Maurice A. Bigelow, Ph.D., Sc.D.; and "Legal Aspects of the Venereal Diseases," by Jacob A. Goldberg, Ph.D.

RAY H. EVERETT

Syphilis, Gonorrhea, and the Public Health—*By Nels A. Nelson and Gladys L. Crain. New York: Macmillan,* 1938. 360 pp. Price, $3.00.

The authors of this book are to be congratulated upon the success with which they have solved the many problems which must have arisen in presenting the salient facts concerning the natural history and control of these two diseases to the diverse groups which are, or should be, interested. The book is written for "health officers, physicians, nurses, social workers, and public health workers in general, as well as that part of the general public which is interested in the control program."

The three main divisions will appeal to different groups of readers, but each is comprehensive and authoritative enough to justify getting the book for its sake alone. The first main division (Part II) outlines for syphilis and gonorrhea separately the basic facts about the causative agents, course of infection, diagnosis, treatment—including unfavorable reactions to treatment—and modes of infection. It is unfortunate that a more definite position could not have been taken on the treatment of gonococcal infections with sulfanilamide at the time this section was written, but the authors have at least taken a conservative stand in awaiting the verdict of more extensive trial. The discussion of the clinical aspects uses technical terms, but these are explained in sufficient detail so that laymen should have little difficulty. Medical readers also will find these chapters highly informative.

The second main division (Part III) consists of a review of the somewhat fragmentary knowledge of the general epidemiology of gonorrhea and syphilis, each item being presented with due regard for its limitations.

The third main division (Parts IV and V) is the most significant for the public health worker, for it discusses control programs and the problems encountered in their formulation and application. Few Gordian knots are cut but the authors do not fail to offer practical approaches to the solution of questions confronting both state and local health workers, including methods of reporting, case finding and case control, the provision of laboratory, therapeutic, and consultation services, education of the various groups chiefly concerned, the relative duties of nurses and of social workers, financing, and the relationship of social hygiene to the control program.

It does not detract from the value of this book to say that the discussion is largely from the point of view of the control program as developed by the Massachusetts Department of Public Health, for that state has an advanced program—thanks in no small degree to the senior author. In its broad outlines the Massachusetts program accepts the measures recommended by the U. S. Public Health Service for state and local health departments in January, 1936.[1] However, there are a number of respects in which it is definitely at variance with current practice elsewhere and with the recommendations expressed or implied. Among these are the inclusion of gonorrhea with syphilis on an active basis in the control program, and the fact that legislation "against" the disease is kept at a minimum. The authors cite conflicting viewpoints and give their opinions, which are cogently expressed.

The volume draws from the experience of a decade of earnest and thoughtful work in the field of the genitoinfectious diseases and should be widely read.

1. Vonderlehr, R. A., *et al.* Recommendations for a Venereal Disease Control Program in State and Local Health Departments. *V. D. Inf.*, 17, 1:1-16 (Jan.), 1936.

RALPH E. WHEELER

Nutrition of the Infant and Child—*By Julian D. Boyd, M.D. New York: National Medical Book Co.*, 1937. 198 pp. Price, $3.00.

This monograph should prove helpful to the medical student and general practitioners of medicine. The pediatric specialist will find very little new material in it. The book apparently was not conceived for the lay reader. After the fundamental considerations of food requirements are stated, considerable attention is given to departures from normal nutrition. The chapters on breast and artificial feeding are very practical. The illustrations deal largely with pathologic conditions due to malnutrition, undernutrition, and avita-

minoses. Practical methods of handling the infant for various therapeutic measures are well described and illustrated. Helpful tables and diet schedules for the normal and the sick infant are given at the end.

RICHARD A. BOLT

Child Guidance Procedures: Methods and Techniques Employed at the Institute for Juvenile Research — *The Century Psychology Series. By the Staff of the Institute for Juvenile Research, Chicago, Paul L. Schroeder, M.D., Director. New York: Appleton-Century,* 1937. 362 pp. Price, $2.50.

The Institute for Juvenile Research, in a quite definite sense, may be looked upon as the parent organization in the field of child guidance clinics. From it also have come some notable studies particularly in the fields of sociology, psychology, and psychiatry which amply justify the authors in looking upon the institute as a research center. It has served as a training center, though its chief purpose has been service to those brought to its attention.

This well written and well edited book aims to make explicit the procedures in child guidance as practised in the institute. There are chapters devoted to the Social History, The Medical Study, the Psychological Examination, The Psychiatric Interview—the so-called fourfold approach to the problem—and also a chapter entitled The Recreation Study. In the majority of clinics the latter is not assigned to special workers, and we see no particular reason for separating it as a special procedure. A good deal of the material investigated would quite naturally fall to the lot of social worker and, in particular, psychiatrist. In fact, one could well raise the question—and the authors hint at it—Whether this division into 4 or more parts at the hands of as many individuals of different and diverse training is either so valuable or so necessary. There has been a growing tendency in many clinics to ignore the so-called fourfold approach and to center the study and treatment in one or another of the staff, depending on the nature of the problem presented. Clinics may vary markedly in their intake policy, which in turn would affect the nature of the study. Those clinics which can control their intake policy and in which psychiatry is emphasized—not sociology—will deal with neurotic children to a much greater degree than with social delinquents, and the approach will of necessity be different.

There is an interesting chapter entitled, Synthesis and Program of Therapy, in which appears an Outline of Psychotherapy and Other Aids in Adjustment. In it are outlined various procedures and technics that may be employed by the psychiatrist in treatment.

The illustrative cases, as is usual, do not clearly illustrate, though they do show what can be done, often under adverse conditions.

The chapter, The Clinic and the Community, Table I, shows what we feel to be a desirable trend, namely the acceptance in recent years of many more cases referred by parents and schools and less from the social agencies. This points to the institute's increasing interest in the neurotic child and a more definitely psychiatric approach to the problems.

The book quite adequately presents what the title indicates—child guidance procedures. It undoubtedly will serve to give the reader not trained in a child guidance clinic an idea of the procedures, methods, and ideology of the average clinic. We recommend it to health officers, administrators and, in particular, those dealing with child Welfare.

HENRY C. SCHUMACHER

Graphs: How To Make and Use Them—*By Herbert Arkin and Raymond R. Colton. New York: Harper,* 1936. 224 pp. Price, $3.00.

This book should be on bookshelves next to "Statistical Methods" by the same authors. It is the first book on graphs in which we have seen all of the "tricks of the trade" listed.

The first three chapters are devoted to principles, construction, and equipment, in which are set forth the various kinds of paper, pens, inks, and lettering guides. Separate chapters are devoted to the different types of charts where in each case may be found a list of common errors to avoid. The authors cite rules for titles and footnotes which if followed would take the curse off many charts. They also stress the point that charts should be simple and should tell one story, not many. Chapters are also given to reproduction of graphs and the preparation of statistical tables and reports. There is also a complete index.

The entire book is written in the simple straightforward style that made *Statistical Methods* so valuable.

While it does not confine itself to the presentation of public health statistics all of the material is applicable to this field and it will be of great assistance to anyone interested in or concerned with modern graphic presentation of public health statistics for both the lay public and the professional groups.

E. J. CROSS

How To Live—*By Irving Fisher, LL.D., and Haven Emerson, M.D. (20th ed.) New York and London: Funk and Wagnalls,* 1938. 422 pp. Price, $2.50.

A book which has reached its 20th edition and the worth of which has been recognized in every part of the United States, does not call for a review—only an announcement of a new edition. However, this last volume sees Dr. Haven Emerson as co-author with Professor Irving Fisher in place of the late Dr. Eugene Lyman Fisk, who was associated with Professor Fisher in getting out the earlier editions, and to whose memory the book is now dedicated.

This edition has followed the earlier ones in bringing the subject matter up to date and in presenting the most recent authoritative conclusions on each subject discussed. The authors regard the book as unique and even radical in its recommendations, but properly hold that it is based on the work of conservative advisers and hope that they are just a little ahead of the world, which will eventually catch up with them.

A striking feature is the 32 appendices, each by a specialist in his field. These appendices constitute approximately two-thirds of the volume. A good index adds to the value. It should be noted that the royalties from the sale of this book will be donated to meet the expense of the Vitality Records Office through which valuable information is being collected as to the influence of habits on health.

It can be recommended without reserve. It will unquestionably maintain the high place in the regaard of the public earned in the past.

MAZŸCK P. RAVENEL

The Radiology of Pulmonary Tuberculosis—*By J. E. Bannen, M.B., Ch.B., D.M.R.E. Baltimore, Md.: Wood,* 1937. 156 pp. Price, $4.50.

This is an excellent synopsis of the subject. To those in public health work who desire to refresh themselves concerning the pathology of the lungs as revealed by X-ray, it should be of inestimable help.

There is a good chapter on the physical examination of the chest and the clinical aspects of pulmonary tuberculosis. The illustrations are adequate

and a good bibliography is provided.

It is recommended to those who use X-ray in case finding.

HARRY E. UNGERLEIDER

Bulletin of the Health Organisation of the League of Nations—*Geneva*. Vol. VI, No. 4, August, 1937, 177 pp.

This bulletin is devoted to two subjects and contains a large amount of valuable information. Both subjects are important and timely. The first deals with the Hygiene of Housing; and the second, with Physique and Health. An extensive bibliography is given at the end of each presentation.

The discussion of the Hygiene of Housing is divided into three parts. The first deals with the report of the Housing Commission of the League and tells briefly of the work done by the various Committees on the Hygiene of Housing in the United States, France, the Netherlands, Poland, the United Kingdom, Sweden, and Czechoslovakia.

The second part deals with the report of the Housing Commission of the League and its associated experts, on the Hygiene of Environmental Conditions in the Dwelling. Among the items discussed are: factors influencing bodily heat exchanges and comfort; sensation of warmth; optimum environmental conditions; methods of measuring environmental conditions; transmission and accumulation of heat by building materials; heating; cooling; ventilation; air conditioning; and program of studies; coöperation, and teaching.

The third part deals with the report on Noise and Housing which was made by the same Commission and a special group of experts.

The second subject treated in the *Bulletin* deals comprehensively with Physique and Health. The report represents the results of a series of inquiries into the physiology, anthropometry, pathology, physical activity, and education of human beings throughout the life span. In the words of the author, "after successfully tackling epidemiology and the environment of life, hygiene is turning its attention to man viewed as a whole." Each phase of life, from the prenatal stage and infancy to old age, comes in for special consideration. The basic data have been obtianed from studies made in Austria, Great Britain, Czechoslovakia, Denmark, France, Germany, and Poland. Data from investigations conducted in the United States are also cited. To those who are interested in the growth of children, their physical defects, and their hygienic treatment, including provision for physical exercise and play, the report should prove of great interest and value.

MURRAY P. HORWOOD

The Diagnosis of Syphilis by the General Practitioner—*By Joseph Earle Moore, M.D. U. S. Public Health Service pamphlet (originally Supplement No. 5 to Venereal Disease Information). Washington: U. S. Govt. Print. Off.*, 1938. 36 pp. Price, $.10.

Because case finding is basic in the stamping out of syphilis and because medical practitioners have the best opportunities for case finding, the means by which the practitioner can more readily suspect and more accurately diagnose suspected cases are given in this compact outline of diagnosis. Diagnostic maxims and lists of conditions with which syphilis should be considered in differential diagnosis are given in tabular form. The sole emphasis is not, however, upon diagnosis as a means of case finding. Contact follow-up is urged as a no less vital aspect of case finding and "the unavoidable responsibility of every physician who makes the diagnosis of early syphilis."

RALPH E. WHEELER

Sewerage and Sewage Treatment —*By W. A. Hardenbergh. Scranton, Pa.: International Text Book Co.*, 1936. 396 pp. Price, $3.50.

This is an elementary textbook which covers the field in 24 chapters.

Hydraulics of sewers	24 pp.
Pipe sewers	28
Sewers built in place	11
Sewer appurtenances	20
Miscellaneous features of sewerage systems	13
Planning of sewerage systems	13
Design of sanitary sewers	32
Design of storm and combined sewers	30
Pumping of sewage	11
Construction of sewers	17
Records and estimates	14
Fundamentals of sewage treatment	17
Dilution and irrigation	5
Grit removal and screening	14
Sedimentation	30
Chemical treatment of sewage	15
Activated sludge treatment	11
Secondary treatment of sewage	29
Treatment and disposal of sludge	7
Disinfection	6
Industrial wastes	3
Institutional waste treatment	17
Operation of sewage treatment plants	4

The preface states that the book is intended to present a balanced and basic treatment of the subject for the student and also a text for the engineer who is confronted only occasionally with problems in this field. As a first reader in the sewerage and sewage treatment field, the book is well written and of use to those who are not familiar with the more detailed textbooks. Its value would certainly seem to be impaired by the omission of references, except to ASTM standards. The discussion of sewerage is excellent. In general, the material is up-to-date and illustrates recent practice. For health officers, non-technical sewage works operators, and laymen who want general information, the book should be of value.

A few errors were noted. In discussing the activated sludge process, the author states that many kinds of air diffusers have been tried, but those made from ground quartz have generally been found most suitable. However, in the last 10 years carborundum and alundum have proved equally acceptable. The author also states that "the plates are usually set in cement mortar in order to prevent clogging around the edges." The real reason for the mortar is to hold the plates in place.

The design of final sedimentation tanks for activated sludge is summed up in 6 lines, saying the same general principles apply as in the case of sedimentation tanks in other processes. Practice has, however, shown a wide difference in design of settling tanks for handling raw or chemically coagulated sewage and activated sludge.

The treatment of the subject of sludge disposal is rather summarily handled. The disposal of air-dried sludge for fertilizer might have been mentioned, as at Baltimore, Rochester (N. Y.), and many other cities. In dewatering digested sludge on a vacuum filter the use of lime as a conditioning agent should have been included. Elutriation, though mentioned, should be noted as of value chiefly only on digested sludge.

In discussing chlorination, the author revives an outworn belief that bleaching powder has the advantage "that the chlorine contained in it is more effective for sewage chlorination than is liquid chlorine."

LANGDON PEARSE

Jurisprudence for Nurses: Legal Knowledge Bearing Upon Acts and Relationships Involved in the Practice of Nursing — *By Carl Scheffel, Ph.B., M.D., LL.B., and Eleanor McGarvah, R.N. (2nd ed.). New York: Lakeside Publishing Co.*, 1938. 248 pp. Price, $3.00.

The second edition of this text, first

issued in 1931, has been broadened somewhat to include new material on the legal standards of the nursing profession. Like the first edition, it also presents useful information on legal obligations of nurses, contracts, wills, the nurse as witness, criminal responsibility, and property rights. It should be helpful to nurses in the prevention of personal litigation, which in this legalistic era seems to be an achievement almost as salutary as the prevention and alleviation of disease.

JAMES A. TOBEY

BOOKS RECEIVED

THE TECHNIQUE OF CONTRACEPTION—AN OUTLINE. By Eric M. Matsner, M.D., and Frederick C. Holden, M.D. 4th ed. New York: National Medical Council on Birth Control, 1938. 50 pp. $.50.

THE TROUBLED MIND—A STUDY OF NERVOUS AND MENTAL ILLNESSES. By C. S. Bluemel. Baltimore: Williams & Wilkins, 1938. 520 pp. Price, $3.00.

WATER SUPPLY AND SEWERAGE. By Ernest W. Steel, C.E. New York: McGraw-Hill, 1938. 653 pp. Price, $5.00.

PHYSICAL AND HEALTH EDUCATION—PRINCIPLES AND PROCEDURES. By Helen Norman Smith and Helen Leslie Coops, Ph.D. New York: American Book Co., 1938. 323 pp. Price, $2.25.

OSLER'S PRINCIPLES AND PRACTICE OF MEDICINE. Originally by Sir William Osler, M.D. Revised by Henry A. Christian, M.D., LL.D. 13th ed. New York: Appleton-Century, 1938. 1424 pp. Price, $9.00.

POISONING THE PUBLIC. By Russell C. Erb. Philadelphia: Dorrance & Co., 1937. 219 pp. Price, $2.00.

ADVENTURES IN SELF-DISCOVERY. By David Seabury. New York: McGraw-Hill, 1938. 324 pp. Price, $2.50.

PENNY MARSH. PUBLIC HEALTH NURSE. By Dorothy Deming. New York: Dodd, Mead, 1938. 266 pp. Price, $2.00.

AN INTRODUCTION TO MEDICAL STATISTICS. By Hilda M. Woods and William T. Russell. London: King & Son, 1936. 125 pp. Price, $2.75.

THE NEW BABY. By Evelyn S. Bell and Elizabeth Faragoh. Philadelphia: Lippincott, 1938. Price, $1.00.

SOCIAL WELFARE LAWS OF THE FORTY-EIGHT STATES. Compiled by Wendell Huston. Seattle: Wendell Huston Co., 1937. Loose Leaf Form. 1400 pp. Price, $12.50.

THE LABORATORY. Vol. 9, No. 5. Published by the Fisher Scientific Co., Pittsburgh. 16 pp. Free.

YOUR BABY AND CHILD. By M. C. Overton. Lubbock, Tex.: Your Baby and Child Pub. Co., 1936. 224 pp. Price, $2.00.

ADVENTURES IN LIVING SERIES. NEW WAYS FOR OLD. By Thomas D. Wood, Marion O. Lerrigo and Nina B. Lamkin. New York: Nelson, 1938. 320 pp. Price, $.88.

A TEXTBOOK OF PATHOLOGY. For Use in Schools of Nursing. By Armin V. St. George. 2nd ed. New York: Macmillan, 1938. 238 pp. Price, $1.75.

TEXTBOOK OF ANATOMY AND PHYSIOLOGY. By Diana Clifford Kimber, Carolyn E. Gray, and Caroline E. Stackpole. 10th ed. rev. New York: Macmillan, 1938. 643 pp. Price, $3.00.

BABIES ARE HUMAN BEINGS. By C. Anderson Aldrich and Mary M. Aldrich. New York: Macmillan, 1938. 128 pp. Price, $1.75.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

France Goes After Diphtheria—Translation of the French law requiring immunization of all children during infancy or the second or third year of life.

ANON. Diphtheria Immunization Made Compulsory in France. Pub. Health Rep. 53, 30:1301 (July 29), 1938.

Diphtheria Prevention—New England and Middle Atlantic cities report a continuing downward trend in diphtheria, as do the western cities. Elsewhere the record is not quite so good. There is evidence that the preventive program produces results.

ANON. Diphtheria Mortality in Large Cities of the United States in 1937. J.A.M.A. 111, 6:524 (Aug. 6), 1938.

Where Diets Are Deficient—Calcium lactate in half-grain daily doses accelerated growth and improved the condition of poorly nourished nursery children. Teachers thought it helped the mental performance of the children too. It is recommended as a partial milk substitute when fresh milk cannot be supplied.

AKROYD, W. R., and KRISHNAN, B. G. Effect of Calcium Lactate on Children in a Nursery School. Lancet. 2, 3:153 (July 16), 1938.

How They Die of Rabies—First-hand observations upon a dozen persons as they died of rabies: with pictures! These might be useful for health educators who have to meet anti-vivisectionists on their home grounds.

BLATT, M. L., *et al.* Rabies. J.A.M.A. 111, 8:688 (Aug. 20), 1938.

Catching Up with the Migrant—For the hundreds of thousands who migrate to California seeking jobs, the state health service furnishes maternal and infant hygiene, tuberculosis case finding, public health nursing and education in nutrition. What the wanderers seem to need most is education in hygienic living. Administrators will want to know just what this state is doing, hence the report is most timely.

DICKIE, W. M. Health of the Migrant. J.A.M.A. 111, 9:763 (Aug. 27), 1938.

Hitler Jugend and T.B.—In Germany, where everyone presumably is under the control of the State, tuberculosis prevention should be a really productive enterprise, but it seems that it suffers from much the same faults as the program in this country where individualism—rugged or ragged—reserves to each the right to enjoy his infection unmolested.

EDWARDS, H. R. Tuberculosis Control in Germany. Am. Rev. Tuberc. 38, 1:115 (July), 1938.

Brucella Infections and the Lab.—Evidence is presented indicating that no single test can be relied upon to give unfailing proof of chronic brucellosis. High agglutination titres are of significance, a positive skin test is suggestive, and an opsonic reaction is found least reliable. Some brucella infections are negative to all three tests.

EVANS, A. C., *et al.* Studies on Chronic Brucellosis. Pub. Health Rep. 53, 34:1507 (Aug. 26), 1938.

Measles in a School Community—In an epidemic of measles in a boarding school, healthy susceptible children should be allowed to have a normal attack of the disease, while "delicate" susceptibles should be partially or completely protected with immune serum.

How the epidemic was treated in one British institution is told.

HOBSON, F. G. Measles. The Conduct of a School Epidemic. Brit. M. J. 4046:171 (July 23), 1938.

Protecting British Mothers—Four British papers on prevention of puerperal sepsis cover about the same ground that four similar American papers would traverse. As with us, the way is evident, but the performance totters. American pediatricians will read the series with sympathetic interest.

JOHNSTONE, R. W., *et al.* The Prevention and Control of Puerperal Sepsis. Brit. M. J. 4049:331 (Aug. 13), 1938.

It Runs in Families—Siblings of children susceptible to caries had more than twice the incidence of tooth defects that afflicted the brothers and sisters of persons with healthy teeth. The conclusion is justified that familial resemblances in carious conditions exist. No specific explanation is offered.

KLEIN, H., and PALMER, C. E. Studies on Dental Caries. Pub. Health Rep. 53, 31:1353 (Aug. 5), 1938.

Of Interest to Pneumonia Campaigners—Reporting the successful use of anti-pneumonia rabbit serum in 6 types of pneumococcus pneumonia. No patients died when treated within 90 hours, and no untoward reactions marred the picture.

LOUGHLIN, E. H., *et al.* The Treatment of Lobar Pneumonia with Rabbit Anti-pneumococcus Serum. J.A.M.A. 111, 6:497 (Aug. 6), 1938.

Public Hygiene and Decent Housing—Our duty is clear, concludes this Canadian sanitarian: use every opportunity to bring to public attention the urgent need for play space, and the desirability of one-family dwellings; get solidly behind every effort being made to provide adequate housing facilities. Would that the duty were equally clear to all sanitarians in the United States!

MACDONALD, R. ST. J. Progress in Housing and Health. Canad. Pub. Health J. 29, 8:377 (Aug.), 1938.

Recent Social Hygiene Events—Herein is recounted what state health departments and local official and voluntary agencies are doing in the prevention of syphilis: an impressive total of activities.

PINNEY, J. B., and SHENEHON, E. N. Footnotes to Progress. J. Social Hyg. 24, 5–6:245 (May-June), 1938.

Noise—Even though Heaven is alleged to have a select choir and a good loud orchestra, what this earth needs is more quiet, says this British authority on ear-shattering noises by day and sleep-disturbing rackets by night. He discusses the reasons why.

PURVES-STEWART, J. The Influence of Noise on Health. J. Roy. San. Inst. 1, 11:667 (Aug.), 1938.

Serving the Worker in Small Industries—Because a very great number of workers are employed, collectively, in plants each too small to provide a health service, there is an effective opportunity here for governmental health administration. How far these needs are being met is told, and a promising program is suggested.

SAYERS, R. R., and BLOOMFIELD, J. J. Public Aspects of Industrial Health. J.A.M.A. 111, 8:679 (Aug. 20), 1938.

For Industrial Hygienists—Although there is no one sure method of preventing the pneumoconioses, the conditions causing them may usually be avoided if industrial engineers and physicians will coöperate in adopting measures of known effectiveness.

SAYERS, R. R., and JONES, R. R. Silicosis and Similar Dust Diseases. Pub. Health Rep. 53, 33:1453 (Aug. 19), 1938.

ASSOCIATION NEWS

THE TWENTIETH ANNUAL HEALTH EXHIBIT

ALMOST as important as the scientific program at Annual Meetings of the Association is the Health Exhibit which at Kansas City will be celebrating its twentieth anniversary.

The great Exposition Hall of the Municipal Auditorium in Kansas City is the scene of the Twentieth Annual Health Exhibit. Here, on the same floor with Registration and Information Headquarters, Health Education and Publicity Headquarters, the Motion Picture Theatre, the Association and Local Committee offices, more than one hundred commercial and scientific exhibitors will hold forth. The commercial exhibitors have been carefully selected and screened and only those organizations with products of real worth are permitted to engage the attention of the 3,500 delegates. The Health Exhibit, therefore, is a setting for pedigreed products and, as such, they are commended to public health workers for purchase for their departments and institutions and for recommendation to the public.

The exhibitors whose applications for space have been accepted are:

Abbott Laboratories
American Can Company
American Cyanamid & Chemical Corp.
Birds Eye Laboratories
The Borden Company
Carnation Company
The Coca Cola Company
Dermetics Company
Difco Laboratories, Inc.
The Diversey Corporation
Eisele & Company
J. B. Ford Sales Company
Gerber Products Company
Geuder, Paeschke & Frey Company
Gilliland Laboratories
A. J. Griner Company
Hobart Mfg. Company
Horlick's Malted Milk Corp.
Hygeia, The Health Magazine
Holland-Rantos Company, Inc.
Irradiated Evaporated Milk Institute
Kaustine Company, Inc.
Kellogg Company
Kolynos Company
Lea & Febiger
Lederle Laboratories, Inc.
Lily-Tulip Cup Corporation
The Macmillan Company
Metropolitan Life Insurance Co.
Philip Morris & Company, Ltd., Inc.
National Dairy Council
National Live Stock & Meat Board
Pet Milk Sales Corporation
W. B. Saunders Company
The Sealright Company, Inc.
Sealtest, Inc.
E. R. Squibb & Sons
Vitex Laboratories, Inc.
Wallace & Tiernan Company, Inc.
Westinghouse Mfg. Co.

Association members, health departments, national and local agencies are contributing to the technical exhibit a series of timely and important scientific subjects presented graphically. Among the exhibitors in this section are the

U. S. Public Health Service
Hooper Foundation Medical Centre
Kansas City (Kans.) Health Department
Kansas City (Mo.) Health Department
New York City Health Department
Bishop Clarkson Memorial Hospital
Kansas City Health Conservation Association
New York State Department of Health
American Social Hygiene Association
Missouri State Health Department

Nurse Placement Service
National Organization for Public Health Nursing
Missouri Public Health Association
Kansas City Children's Bureau
American Association of State Registration Executives
National Association of Sanitarians, Inc.
Jackson County Medical Society
Arkansas State Board of Health
Iowa State Department of Health
The Commonwealth Fund
American School Health Association
International Society of Medical Health Officers
National Society for the Prevention of Blindness, Inc.
Yale School of Medicine
University of Pennsylvania School of Medicine
Queensboro Tuberculosis and Health Association
National Institute of Health

There is material in the Health Exhibit, under both technical and commercial auspices, well worth careful examination and study. In order to extract the most of value from their attendance at the Annual Meeting, delegates should budget their time, allocating a goodly share of it to the exhibits.

Books at the Annual Meeting

THE Association's Book Service will repeat at Kansas City the exhibit of health books of all publishers to which delegates to the Annual Meeting turn for information about the best and newest of the literature of their field.

No one is under any compulsion to buy. Of course, the Book Service is in the book-selling business, and Mrs. Andrus, the Association's Librarian in charge, will gladly hold your coat while you make out your check if you feel the acquisitive urge that overcomes all book-lovers at the sight of a thousand or more volumes stacked on shelves.

Come to the Book Exhibit and examine the books on display. If you read fast you may be able to get through several of the more absorbing before the meeting is over. Comfortable chairs will be provided. Your free copy of the 1938 *Bibliography of Health Books* will be on hand for you.

Invitation from Chicago to Delegates en Route to Kansas City

DR. Herman N. Bundesen, President of the Chicago Board of Health, announces that the Chicago Municipal Social Hygiene Clinic has recently moved into new and spacious quarters at 26th Street and Wabash Avenue. He goes on to say "Our facilities there are far better than anything we have had in this line in the past, comprising separate space for diagnosis, treatment, social service, and educational activities. Also the male patients are examined and treated on a different floor from the female cases."

Dr. Bundesen believes that these new facilities may be of considerable interest to health officers, and he invites members and guests of the Association who pass through Chicago at any time, and particularly on their way to and from Kansas City, to visit the Clinic.

New Members of A.P.H.A. Due to Western Branch Activities

THE Western Branch of the American Public Health Association conducted a membership campaign in the months preceding its last Annual Meeting. Each of the 17 states, territories and provinces comprising the Branch coöperated with the result that the names of over 200 new members were added to the A.P.H.A. membership roster. Top honors went to the State of Utah which had a gain in membership of almost 150 per cent.

Efforts like this have played an important part in bringing the membership of the Association up to the highest point in its history—over 6,200 on September 1.

PROGRAM OF THE INSTITUTE ON THE PRACTICAL ADMINISTRATION AFFAIRS OF THE HEALTH OFFICER

SPONSORED by the International Society of Medical Health Officers, for the benefit of all Officials and Public Health Workers Interested in Public Health Administrative Problems.

Kansas City, Mo.—Monday, October 24, 1938
9:30 A.M. Room 401, Auditorium

Presiding: E. L. BISHOP, M.D., President, and LEON BANOV, M.D., Secretary-Treasurer.

The New Appraisal Form for Public Health Work. W. F. WALKER, DR.P.H.

Practical Application of the Appraisal Form. V. L. ELLICOTT, M.D., DR.P.H.

The Place of the Local Health Department in a National Health Program. C. E. WALLER, M.D.

Effective Use of Federal Aid in the Local Public Health Program (With lantern slides). JOHN L. RICE, M.D.

Behavior of Health Jurisdictions with Respect to Employment of Health Officers. JOSEPH W. MOUNTIN, M.D.

Practical Methods of Developing a "Career Service" in Public Health. WILLIAM E. MOSHER, PH.D.

Practical Points in Securing Adequate Appropriations for Health Departments. WALTER N. KIRKMAN.

The Seasonal Emphasis of Various Health Services. J. N. BAKER, M.D.

2:30 P.M. Second Session, Room 401, Auditorium

Practical Problems of Staff Organization. HUNTINGTON WILLIAMS, M.D.

Budgets and Budget Making. J. W. BASS, M.D.

The Annual Report as a Sales Argument for Adequate Appropriations. WILLIAM H. ENNEIS, M.D.

The "How" of Public Health Education. Practical Points on preparing newspaper interviews, radio talks, health meetings, etc. W. W. BAUER, M.D.

Practical Use of Visual Education in Public Health. H. H. WALKER, C.P.H., PH.D.

Selling the Health Department to the Public by Means of Public Health Education. PHILIP S. BROUGHTON.

Practical Record Keeping. W. VAL SANFORD, M.D.

Practical Uses of Vital Statistics. GEORGE H. VAN BUREN.

6:30 P.M. Dinner Session, Continental Room, Hotel Kansas Citian

Presiding: EDWIN H. SCHORER, M.D., DR.P.H. *Toastmaster,* E. L. BISHOP, M.D.

My Most Humorous Experience as a Health Officer.

My Most Serious Experience as a Health Officer.

My Most Embarrassing Experience as a Health Officer.

My Most Pleasant Experience as a Health Officer.

"Experience" speakers will be selected from the guests. YOU may be called upon for an experience, so please put on your thinking cap.

New Frontiers of Preventive Medicine. FRANK G. BOUDREAU, M.D.

Fraternal Greetings. REGINALD M. ATWATER, M.D.

A closed session for members only, for election of officers and the conduct of general business will be held immediately following the dinner session. Society members are requested to remain.

1938 HEALTH CONSERVATION CONTESTS

THE Committee on Administrative Practice of the American Public Health Association has announced the 1938 Health Conservation Contests for cities and rural areas. This is the 10th year of the project among cities, and the 5th year of the project among full-time rural areas. They continued to grow during 1937, and give promise of expansion both in the United States and in the Dominion of Canada.

In the 1937 Contests the response among Canadian rural units far exceeded expectations, and already additional rural health units are enrolling and planning to submit fact-finding schedules. The Provinces of Prince Edward Island and New Brunswick have signified their intention of being represented in 1938; all the newly organized health units in the Province of Quebec intend to participate; and it is expected that all the 32 Quebec units enrolled for 1937 will again be in the Contest this year.

The Rural Contests both in the United States and Canada were again underwritten by the W. K. Kellogg Foundation of Battle Creek, Mich., while the City Contest in the United States was supported by the contributions of life insurance companies. Most gratifying is the wider interest of the life insurance groups and the fact that 26 new companies are now listed as financial supporters of the 1938 Contest.

The Committee on Administrative Practice has enlarged and amended the 1938 fact-finding schedules to give a more clearly defined picture of the health activities carried on and the attainments of the different units, thereby aiding the Grading Committee in the ranking of competing units.

Special competitions for syphilis and tuberculosis control activities are again included. This has provided opportunities for areas to secure recognition for outstanding special work. In the 1937 Contest the best showing along these special lines of health activity was made in those places where the public health program along all recognized lines was best developed and rounded.

After another year of almost continuous field contacts with the competing cities and counties, Dr. James Wallace of the Association staff, who is Field Director for the Health Conservation Contests, pointed out that across the continent these Contests continue to provide the *occasion* for initiating new programs and for accentuating and expanding programs already adopted. He

said that the Contests provide the means of uniting many agencies in the health program and, in particular, the business groups through intimate relationships to chambers of commerce and other business agencies. According to Dr. Wallace, the Contests help to standardize health work but primarily aid in individualizing it and in pointing out and achieving the objectives which are of prime importance to the community. "Every participant in these Contests is a winner," said Dr. Wallace, "because the chief award is in the interest awakened, the information disseminated, and the local accomplishments in public health which result."

New Units are currently enrolling from North Dakota, Washington, North Carolina, Ohio, Oregon, Kentucky, Florida, and the Canadian Provinces. Every city in the United States is eligible to participate and every full-time county or district health unit in the Dominion or the United States.

The cities enrolled for the City Contest in 1937 totalled 264 and the Rural Contest included 276 areas, of which 241 were in the United States and 35 in Canada.

Serodiagnostic Tests for Syphilis

THE Assembly of Laboratory Directors and Serologists, to Consider Means and Methods to Improve and Make More Available Serodiagnostic Tests for Syphilis, will be held under the auspices of the Committee on Evaluation of Serodiagnostic Tests for Syphilis, at Hotel Arlington, Hot Springs National Park, Ark., October 21–22, 1938. Thomas Parran, Surgeon General, U. S. Public Health Service, will be Chairman.

The purpose of this Assembly is to permit free discussion of the means and methods to improve and make more generally available serodiagnostic tests for syphilis.

This meeting is being held at the end of the week preceding the Annual Meeting of the American Public Health Association. It is hoped that laboratory directors and serologists working in public health, hospital and private laboratories from all over the United States will attend.

An invitation is extended to members of the Laboratory Section of the American Public Health Association.

Association of Women in Public Health

WEEK-END hotel reservations at the Elms, Excelsior Springs, Mo., where the Association of Women in Public Health will meet on Sunday, October 23, and Monday, October 24, may be made through the Local Chairman, Miss Rosamond Losh, Children's Bureau, Kansas City, Mo. Single rooms with bath from Saturday afternoon through Monday luncheon $12.00; two in a room $9.50 each.

The meeting begins with a tea and informal get-together on Sunday from 4:30 to 6:00. Monday morning an extensive and interesting program is scheduled followed by a luncheon session at 1:00 with addresses by Dr. Frank Boudreau, Dr. Margaret W. Barnard, and Dr. Michael M. Davis. A business session at 3:30 closes the Excelsior Springs events.

At 7:30 Monday evening, a dinner session will be held in the Hotel Muehlebach, Kansas City, to which all are invited.

State Directors of Public Health Nursing

A CLOSED meeting for state directors of public health nursing will be held in Room 203 of the Auditorium Monday, October 24, 1938, preceding the annual meeting of the American Public Health Association in Kansas City, Missouri. Hours for the morning session will be 9:00 to 11:00 A.M. The afternoon session will open at 1:00 P.M.

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

William E. Alexander, M.D., Memphis, Mo., County Health Officer

John M. Allaman, M.D., Central Bldg., St. Joseph, Mo., Health Officer

Floyd C. Beelman, M.D., 300 S. Broadway, Wichita, Kans., Sedgwick County Health Officer

Max E. Blue, M.D., Burkesville, Ky., Cumberland County Health Officer

William B. Buckner, M.D., P. O. Box 127, Albany, Ga., Dougherty County Health Commissioner

John R. Claussen, M.D., County Court House, Florence, S. C., County Health Officer

Francis J. Clements, M.D., Stony Creek, Va., Sussex County Health Officer

John M. Collins, M.D., State Dept. of Health, Seattle, Wash., Health Officer Appointee

Robert H. DeJarnette, M.D., Corinth, Miss., Director, Alcorn County Health Officer

Edgar A. Dimond, M.D., 300 S Broadway, Wichita, Kans., Assistant County Health Officer

Harrison Eilers, M.D., C.P.H., Los Lunas, N. Mex., District Health Officer

Harry H. Ennis, M.D., C.P.H., District Health Service No. 1, Le Mars, Ia., Medical Director

Douglas H. Fryer, M.D., D.P.H., Eutaw, Ala., Greene County Health Officer

Elmer E. Gay, M.D., Gay Bldg., Richmond, Mo., City Health Officer

James H. Gordon, M.D., P. O. Box 747, Covington, Va., Alleghany-Botetourt Health Officer

Frank Hedges, M.D., Pattonsburg, Mo., Daviess County Physician

Rutherford O. Ingham, M.D., Box 175, Centerville, Ala., Bibb County Health Officer

Todd W. Keith, M.D., Spring St., Harrisville, W. Va., Ritchie County Health Officer

H. E. Kelty, Lakeview, Ore., Lake County Health Officer

Donald G. Kilgore, M.D., 506 Medical Arts Bldg., Dallas, Tex., Highland Park Health Officer and Medical Director, Republic National Life Insurance Co.

Roelof Lanting, M.D., 1221 Ludington St., Escanaba, Mich., Director, Delta County Health Dept.

A. Victor Nasatir, M.D., C.P.H., 2633 Etna St., Berkeley, Calif., Assistant Professor, Public Health Administration, University of California

John A. Norton, M.D., 26 Fordonia Bldg., Reno, Nev., Director, Local Health Administration and Epidemiology, State Board of Health

Maurice L. Peter, M.D., Eastman National Bank Bldg., Newkirk, Okla., Director, Kay County Health Unit

Jack B. Porterfield, M.D., Box 455, Williamsburg, Va., Director, Peninsula Health District

William H. Riheldaffer, M.D., Box 335, Romney, W. Va., Director, Eastern Health District

Frank M. Rogers, M.D., Crittenden County Health Dept., Marion, Ky., County Health Officer

Onal A. Sale, M.D., 113 Hickory St., Neosho, Mo., County Physician

Harold E. Simmonds, M.D., Alamo, Tenn., Crockett County Health Officer

Harry A. Simrell, M.D., Stockton, Mo., County Physician

Albert E. Small, M.D., 90 W. Emerson St., Melrose, Mass., Chairman, Board of Health

Charles M. Smith, M.D., 744 E. 5th S., Provo, Utah, Health Officer

L. F. Weyerich, M.D., 414 E. Third, Cameron, Mo., District Health Officer

John Wilson, M.D., Bloomfield, Mo., County Physician

Laboratory Section

Catherine E. Harris, 2012 N. Ross St., Oklahoma City, Okla., Serologist, State Health Dept.

Frances Kelleam, 1937 W. 17, Oklahoma City, Okla., Technician, State Health Dept.

Mildred M. Moss, 3820 Hill Rd., Little Rock, Ark., Bacteriologist, and Associate Director, Hygiene Laboratory, State Board of Health

J. N. Patterson, M.D., State Board of Health, Jacksonville, Fla., Director of Laboratories

S. Edward Sulkin, 33 Municipal Courts Bldg., St. Louis, Mo., Senior Bacteriologist, Health Dept.

Vital Statistics Section

Oscar F. Maxon, M.D., 800 S. 6 St., Springfield, Ill., Medical Director, Franklin Life Insurance Co.

Harry J. Nestlebush, City Hall, St. Joseph, Mo., Clerk, Board of Health

Public Health Engineering Section

Robert C. Hallett, Boydton, Va., Sanitation Officer, Brunswick-Green-Mecklenburg Health District

Charles L. Langshaw, 23 Buttermere Gardens, Purley, Surrey, England, Sanitary Engineer, Metropolitan Police

John H. Ruge, Marianna, Fla., District Sanitary Officer, State Board of Health

David B. Lee, State Board of Health, Pensacola, Fla., Sanitary Engineer, Escambia County Health Dept.

Curtis A. Burdick, Farmerville, La., Sanitarian, State Board of Health

Earl C. Huston, State Board of Health, Topeka, Kans., District Supervisor, U. S. Public Health Service

John J. Costley, Public Health District No. 5, Kingsville, Tex., District Sanitarian

Gustavo A. Bequer Y Herrera, Calle 4 No. 305, Vedado, Havana, Cuba, Assistant Chief Sanitary Engineer, Instituto Tecnico de Salubridad

William D. Staples, C.E., 315 N. 11 St., Temple, Tex., Sanitary Engineer, Bell County Health Unit

Frank B. Wood, 103 Lexington Rd., Montgomery, Ala., Assistant Sanitary Engineer on Malaria Control, State Dept. of Health

N. J. Gilsdorf, Box 7, Cameron, Mo., District Public Health Engineer, State Board of Health

Roy N. Johnston, C.E., State Board of Health, Topeka, Kans., Assistant State Director, U. S. Public Health Service

Charles R. Millard, 1324 Chester, Stillwater, Okla., Sanitarian, Payne County Health Unit

James D. Caldwell, Bureau of Health, Knoxville, Tenn., Director, Division of Sanitation

Joe L. Walker, Court House, Eldorado, Kans., Sanitarian, Butler County Health Dept.

Industrial Hygiene Section

William N. Witheridge, 1151 Taylor Ave., Detroit, Mich., Industrial Hygiene Engineer, Dept. of Health

Morton D. Schweitzer, Ph.D., 3 West 87 St., New York, N. Y.

Food and Nutrition Section

Pearl Rorabaugh, 933 Kansas Ave., Topeka, Kans., Nutritionist, State Board of Health

Vernon K. Watson, 90 Front St., Canajoharie, N. Y., Physiological Chemist and Bacteriologist, Beech-Nut Packing Co.

Child Hygiene Section

Paul R. Ensign, M.D., Sparta, Ga., Pediatrician, Child Health Demonstration

David W. Goltman, M.D., 129 Physicians and Surgeons Bldg., Memphis, Tenn., Director of Infant Hygiene, Health Department

Florence M. Jones, 3706–81 St., Jackson Heights, L. I., N. Y., Research Assistant, School Health Study

Doris A. Murray, M.D., Dr.P.H., Children's Bureau, Dept. of Labor, Washington, D. C., Senior Medical Officer

George M. Wheatley, M.D., 12–26–31 Ave., Astoria, L. I., N. Y., Assistant Director, School Health Study

Public Health Education Section

Bertha H. Campbell, State Board of Health, Topeka, Kans., Educational Director

Loretta H. Grant, R.N., Hill City, Kans., County Public Health Nurse

Myron W. Husband, M.D., 1733 Laramie, Manhattan, Kans., Director, Student Health Service, Kansas State College of Agriculture and Applied Sciences

Beatrice Kresky, 499 Ocean Ave., Brooklyn, N. Y., Volunteer Worker, Committee on Neighborhood Health Development

Public Health Nursing Section

Ruth Botts, Coldwater, Kans., Comanche County Public Health Nurse

Evelyn C. Brown, Court House Annex No. 2, Toms River, N. J., Supervisor, Ocean County Health Dept.

Helen J. Crowe, R.N., Higginsville, Mo., District Health Nurse, State Board of Health

Alice M. Finley, R.N., P. O. Box 802, Dodge City, Kans., Consultant Nurse, State Board of Health

Frances E. Guinn, R.N., 224 N. 9th St., Clinton, Okla., Field Nurse

Elsya S. Hay, Hartville, Mo., Wright County Public Health Nurse

Hazel Higbee, 2110 Cornell Rd., Cleveland, O., Instructor in Public Health Nursing, School of Applied Social Sciences, Western Reserve University

Annabell Horne, R.N., Box 656, Fort Stockton, Tex., Pecos County Health Nurse

Marie L. Johnson, 33 Washington Square, New York, N. Y., Assistant Director, Nursing Bureau, Metropolitan Life Insurance Co.

Katherine L. Laux, 410 Newhouse Bldg., Salt Lake City, Utah, Supervisor, Metropolitan Life Insurance Nursing Service

Velma G. Long, 824 Kansas Ave., Topeka, Kans., Tuberculosis Control Field Nurse, State Board of Health

Hazel L. Loveland, R.N., 634 Taylor, Topeka, Kans., Consultant Nurse, State Board of Health

Mary E. McAuliffe, R.N., 305 Greenwood,

Topeka, Kans., State Supervisory Nurse, State Board of Health

Alice E. Moody, R.N., 952 Pelhamdale Ave., Pelham Manor, N. Y., Westchester County Health Nurse

Margaret N. Murphy, 519 Dexter Ave., Montgomery, Ala., Advisor in Midwife Control, State Health Dept.

Gladys M. Schuerman, R.N., 9th & Walnut Sts., Rocky Ford, Colo., Supervisory Nurse, Otero County Health Unit

L. Elise Smith, R.N., State Board of Health, Jackson, Miss., Public Health Nurse

Euphrosine Staab, R.N., Box 82, Sublette, Kans., Public Health Nurse, State Board of Health

Edith M. Stanforth, R.N., Ulysses, Kans., County Public Health Nurse

Daisy Stuart, R.N., District Health Office, Cameron, Mo., Public Health Nurse

Emma H. Taliaferro, R.N., Tuckahoe Apts., Richmond, Va., Orthopedic Nurse, State Dept. of Health

Esther N. Walraven, R.N., Children's Bureau, Dept. of Public Assistance, Charleston, W. Va., Supervisor, Orthopedic Nurses Division, Crippled Children

Sue Wilson, R.N., Court House, Boonville, Mo., County Nurse, State Board of Health

Epidemiology Section

Bascom Johnson, Jr., M.D., Box 315, Pleasantville, N. Y., Epidemiologist-in-training, State Dept. of Health

William Mosley, M.D., D.P.H., 269 Soudan Ave., Toronto, Ont., Canada, Clinical Specialist, Provincial Dept. of Health

Evelyn F. H. Rogers, M.D., State Dept. of Health, Albany, N. Y., Epidemiologist-in-training, State Dept. of Health

Milton Trautmann, M.D., C.P.H., State Capitol, Madison, Wis., Venereal Disease Control Officer, State Board of Health

Willard H. Wright, D.V.M., Ph.D., National Institute of Health, Washington, D. C., Senior Zoölogist and Acting Chief, Division of Zoölogy

Unaffiliated

Alan Blanchard, 45 Second St., San Francisco, Calif., Field Representative, Western States Division, American Social Hygiene Association

Pearson D. Brooker, D.D.S., State Board of Health, Columbia, S. C., Director of Dental Health

Sadie D. Clarke, Horry County Health Dept., Conway, S. C., County Nurse

Helen M. Hall, 713 Clifton Ave., Redlands, Calif., Medical Social Worker, State Dept. of Health

Frank W. Kenney, M.D., Capitol Life Insurance Co., Denver, Colo., Medical Director

L. H. Lee, M.D., 523 W. 6 St., Los Angeles, Calif., Medical Director, Pacific Mutual Life Insurance Co.

George McLean, M.D., 109 E. Redwood St., Baltimore, Md., Medical Director, Sun Life Insurance Company of America

Henrietta Mellow, 810 W. 49 St., Los Angeles, Calif., Medical Social Worker, State Dept. of Public Health

Martin I. Olsen, M.D., Insurance Exchange Bldg., Des Moines, Ia., Vice-President and Medical Director, Central Life Assurance Society

Reuben Rapaport, M.D., 510 W. 112 St., New York, N. Y., General Practitioner

Joseph Travenick, Jr., M.D., 1590 4 Ave., N., Nashville, Tenn., Medical Director, Life and Casualty Insurance Company of Tennessee

APPLICANTS FOR FELLOWSHIP

(Other names listed in August Journal)

In accordance with the By-laws the names of applicants for Fellowship are officially published herewith. They have requested affiliation with the Sections indicated. Action by the various Section Councils, the Committee on Eligibility and the Governing Council will take place between now and the time of the Kansas City Annual Meeting.

Health Officers Section

James L. Bowman, M.D., Health Officer, Montgomery County, Montgomery, Ala.

David D. Carr, M.D., C.P.H., Director, Division of Venereal Disease Control and Local Health Administration, State Board of Health, Salt Lake City, Utah

Franklin M. Foote, M.D., Dr.P.H., Chief, Local Health Administration, State Department of Health, Hartford, Conn.

Frank K. Harder, M.D., Acting Health Officer, Cincinnati, O.

Marvin F. Haygood, M.D., C.P.H., Deputy Commissioner and Director, Local Health Service, State Department of Health, Des Moines, Ia.

John L. Jones, M.D., Dr.P.H., State Health Commissioner, Salt Lake City, Utah
Joseph H. Kinnaman, M.D., C.P.H., Assistant Health Commissioner, Peoria, Ill.
Bryan Newsom, M.D., C.P.H., Epidemiologist, Health Department, Seattle, Wash.
Howard A. Orvis, M.D., M.S.P.H., Health Officer, Winnetka and Kenilworth, Winnetka, Ill.
William P. Richardson, M.D., C.P.H., Health Officer, Orange-Person-Chatham District Health Department, Chapel Hill, N. C.
William H. Runcie, M.D., Deputy Health Commissioner, Nassau County Department of Health, Mineola, N. Y.
Richard O'B. Shea, M.D., M.P.H., Health Officer, Bridgeport, Conn.
Adolph Weinzirl, M.D., C.P.H., City Health Officer, Portland, Ore.
Robert B. Wolford, M.D., Director, Public Health District No. 2, Mineral Wells, Tex.

Laboratory Section

Margaret I. Beattie, M.A., Gr.P.H., Assistant Professor of Public Health, University of California, Berkeley, Calif.
E. H. Bramhall, B.S., Director of Laboratories, State Board of Health, Salt Lake City, Utah
Lawrence J. Peterson, B.S., Director of Laboratories, Idaho Division of Public Health, Boise, Ida.

Vital Statistics Section

Thomas W. Chamberlain, Director, Bureau of Vital Statistics, State Board of Health, Jefferson City, Mo.
Elizabeth Parkhurst, M.S., Senior Statistician, State Department of Health, Albany, N. Y.

Industrial Hygiene Section

Leopold Brahdy, M.D., Physician-in-Charge, Workmen's Compensation, New York, N. Y.
Arthur G. Cranch, M.D., Head, Industrial Toxicology Department, Union Carbide Co., New York, N. Y.
Herbert G. Dyktor, Chief Industrial Hygiene Engineer, Health Division, St. Louis, Mo.

Child Hygiene Section

Robert W. Ball, M.D., C.P.H., Director, Maternal and Child Health Division, State Board of Health, Columbia, S. C.
Sarah S. Deitrick, M.D., C.P.H., Regional Medical Consultant, Children's Bureau, Washington, D. C.
Katharine F. Lenroot, LL.D., Chief, Children's Bureau, Washington, D. C.
Abram L. Van Horn, M.D., Assistant Director, Crippled Children, Children's Bureau, Washington, D. C.

Public Health Education Section

James G. Stone, Executive Secretary, Los Angeles Tuberculosis and Health Association, Los Angeles, Calif.
Savel Zimand, Assistant Director, Public Health Education, Department of Health, New York, N. Y.

Public Health Nursing Section

Henrietta W. Bonheyo, R.N., Territorial Supervisor, Southern Territory, Metropolitan Life Insurance Company, New York, N. Y.
Eula B. Butzerin, R.N., M.S., Associate Professor, Department of Nursing Education, University of Chicago, Chicago, Ill.
Loneta M. Campbell, R.N., Director, Visiting Nurse Association, Cincinnati, O.
Bess E. Dalton, R.N., B.S., Supervising Nurse, Forsyth-Stokes-Yadkin-Davie Health District, Winston-Salem, N. C.
Florence W. Englesby, R.N., Chief Consultant of Nurses, State Board of Health, Pierre, S. D.
Laurene C. Fisher, R.N., Director, Public Health Nursing, State Department of Health, Charleston, W. Va.
Grace Frauens, R.N., M.S., Director, St. Joseph Organization for Public Health Nursing, St. Joseph, Mo.
Lalla M. Goggans, R.N., Field Nurse, Mobile Health Unit, State Board of Health, Jacksonville, Fla.
Fern A. Goulding, R.N., Assistant Professor of Hygiene, Iowa State College, Ames, Ia.
Ann M. Hellner, R.N., M.A., Director, Visiting Nurse Association, Bridgeport, Conn.
Virginia A. Jones, R.N., Assistant Director, National Organization for Public Health Nursing, New York, N. Y.
Louise Knapp, R.N., A.M., Professor of Nursing and Director, Department of Nursing Education, Wayne University, Detroit, Mich.
Kathleen M. Leahy, R.N., M.S., Assistant Professor of Nursing Education, University of Washington, Seattle, Wash.
Carrie E. Lewis, R.N., Assistant Director of Nurses, Division of Health, Cleveland, O.
Emma Maurin, R.N., Director, Division of Public Health Nursing, State Board of Health, New Orleans, La.
Marian G. Randall, R.N., B.S., Assistant Director in Charge of Records and Studies, Henry Street Visiting Nurse Association, New York, N. Y.
Emilie G. Robson, R.N., Executive Director, Visiting Nurse Association, St. Louis, Mo.
Clara B. Rue, R.N., B.S., Director, Course in Public Health Nursing, Duquesne University, Pittsburgh, Pa.

Mildred T. Sanderson, B.S., Director, Municipal Visiting Nurses, St. Louis, Mo.

Lona L. Trott, R.N., B.S., Acting National Director, Public Health Nursing and Home Hygiene and Care of the Sick, American Red Cross, Washington, D. C.

Abbie R. Weaver, R.N., M.S., Director, Division of Public Health Nursing, State Department of Health, Atlanta, Ga.

Lucy G. White, M.A., Director, Public Health Nursing Course for Graduate Students, Vanderbilt University School of Nursing, Nashville, Tenn.

Epidemiology Section

Charles F. Church, M.D., Epidemiologist, State Board of Health, Helena, Mont.

John E. Gordon, M.D., Ph.D., Professor of Preventive Medicine and Epidemiology, Harvard Medical School, Boston, Mass.

Elmer R. Pascoe, M.D., Epidemiologist, Health Section, Board of Education, Los Angeles, Calif.

Unaffiliated

Sidney W. Bohls, M.D., Director of Laboratories, State Department of Health, Austin, Tex.

Mary A. Hodge, M.D., Professor of Hygiene, Goucher College, Baltimore, Md.

Richard R. C. Leonard, D.D.S., Chief, Division of Oral Hygiene, State Department of Health, Baltimore, Md.

Abraham J. Levy, M.D., Dr.P.H., District Health Superintendent, State Department of Health, Chicago, Ill.

DECEASED MEMBERS

Samuel M. Creswell, M.D., Tacoma, Wash., Elected Member 1931, Fellow 1934

Lloyd Moffitt, M.D., Yakima, Wash., Elected Member 1931, Fellow 1933

Mary Lucier, New York, N. Y., Elected Member 1936

EMPLOYMENT SERVICE

The Employment Service will register persons qualified in the public health field without charge. Public health nurses are registered with the Nurse Placement Service, 8 South Michigan Avenue, Chicago, Ill., with which the Association coöperates.

Replies to these advertisements, indicating clearly the key number on the envelope, should be addressed to the American Public Health Association, 50 W. 50 Street, New York, N. Y.

POSITIONS WANTED

HEALTH OFFICERS

Physician, M.D., St. Louis University; postgraduate in eye, ear, nose and throat; 10 years' experience in public health administration as director of county health units and epidemiologist with state department; also experienced in welfare administration, prefers administrative public health position in central or western state. Excellent references. **A373**

Physician, M.D., McGill; C.P.H., Johns Hopkins; excellent background of communicable disease control and school health service, seeks position as epidemiologist or public health administrator. **A368**

Experienced health officer; M.D., Class A medical school; completed Vanderbilt short course for Health Officers, 1936; will consider appointment. **A320**

Physician, M.D., Class A medical school; M.P.H., Harvard School of Public Health; extensive experience in pediatrics and school medical services; also background of county health administration and teaching in medical school; will consider expanded opportunity in teaching or research. **A302**

Physician, age 34; M.D., University of Wisconsin; M.P.H., Harvard; specializing in industrial hygiene, will consider general administration. **A342**

Physician, M.D., University of Cincinnati; with postgraduate training in venereal disease control, Johns Hopkins; now employed, is available as venereal disease control officer. **A363**

Well qualified physician, with C.P.H. from Johns Hopkins; experienced as school physician and in college teaching, will consider city or county administrative position or teaching and student health service. **A383**

Physician with Dr.P.H. degree, experienced as a local health officer, in present position since 1929, will consider opening. **A386**

Physician, A.B., M.D., 30 years in a large city health department. Administrative, educational and research experience; also familiar with venereal disease work. **A295**

HEALTH EDUCATION

Woman, well qualified in health education, wishes position as health coördinator or health counsellor. Has wide experience, and Ph.D. from New York University. **M236**

Young woman, M.A., Health Education, Teachers College, Columbia University; with splendid international experience, seeks position as director of health education with preference for New York City. **H369**

Young man, M.S.P.H., University of Michigan; at present college teacher of hygiene and physical education and experienced in university medical service, desires position as executive in public or private health organization. **H357**

Woman, M.D., Boston University; special work Columbia and Massachusetts Institute of Technology; 1 year's experience in state hospital; interested in psychiatry, desires position in the East in hospital for mental diseases or industrial school. **H247**

Young woman, M.S.P.H., University of Michigan, experienced in laboratory research and health education, is available for research or investigative work. **H303**

LABORATORY

Experienced laboratory director with background of dairy products manufacture and research in control methods; University of Wisconsin, M.S. and Ph.D.; desires administrative position with food manufacturing or processing industry, or association with health department doing routine and research work in food control. **L381**

Experienced bacteriologist with teaching in research background, seeks position as director of laboratory. **L370**

Bacteriologist and pathologist with wide administrative experience; Ph.D., Brown University; will consider leading position in his field. **L371**

Laboratory technician; B.Sc. degree; with experience in Army, state public health laboratory, and U. S. Public Health Service field laboratory, seeks position in medical school or university. **L379**

Young woman, M.A. in medical bacteriology, University of Wisconsin, 7 years' experience in a state laboratory of hygiene, desires position in bacteriological diagnosis, research or a combination of the two. **L387**

Young woman, A.B., major in bacteriology; 9 years' experience; now employed in a clinical laboratory desires position in bacteriology or serology in a health department laboratory or in research. **L382**

Bacteriologist, college graduate, special postgraduate work, 9 years' public health laboratory experience in executive, routine and research work, desires to change position. Excellent references. **L385**

SANITARY ENGINEERING

Public health engineer, B.S. in Sanitary Engineering from Massachusetts Institute of Technology, experienced in Massachusetts, Connecticut and Kentucky, seeks position as sanitary or public health engineer with health department. **E380**

Experienced sanitary engineer, graduate of Massachusetts Institute of Technology, seeks responsible position. **E372**

MISCELLANEOUS

Experienced public health nurse executive, Fellow of the A.P.H.A., is available for responsible position. **N384**

Experienced teacher in bacteriology and public health; Ph.D., Cornell; now professor in Grade A medical school, will consider teaching, executive or administrative position. **M327**

Physician, graduate of Johns Hopkins Medical School, and well qualified in medicine and tuberculosis, will consider a clinical position in the medical field. **M377**

Dentist, graduate of Temple University, with excellent postgraduate experience, desires position in administrative aspects of dental hygiene. **M352**

Woman physician, graduate of University of Iowa, who has directed State bureau of maternal and child health, now employed, will consider another position. **C318**

NEWS FROM THE FIELD

PUBLIC HEALTH AND SOCIAL SECURITY

THE U. S. Public Health Service, on the third anniversary of the adoption of the Social Security Act by Congress, pointed out the marked increase in public health facilities resulting from funds provided for this purpose.

Under the provision of $8,000,000 annually for the stimulation of public health activities in state and local governments through the Public Health Service, there were listed the following advances:

The training of 4,300 medical officers, engineers, nurses, sanitation officers, laboratory workers, and others in public health work. An increase from 667 to 1,116 in the number of counties in the country served by full-time public health officers. In 6 states all areas are covered with full-time units, as compared with 3 before the Act became effective. In 24 states there are separate divisions of venereal disease control, in place of 13 three years ago, and the number of states employing a full-time venereal disease control officer has increased from 9 to 30.

Increases were reported from 35 to 44 in the number of states having separate divisions for preventable diseases; from 16 to 31 in the number having divisions for local health administration; from 20 to 32 in the number having divisions for public health nursing; from 3 to 15 in the number specializing in industrial hygiene; from 8 to 17 specializing in dental hygiene; from 16 to 21 in public health education; and from 13 to 17 in tuberculosis control.

It was pointed out that gains also have been recorded in the attention given to cancer control, malaria control, the control of rodent plague, and in laboratory service. Most of the federal appropriations under the Act for maternal and child health are administered by the Children's Bureau of the Department of Labor.

During the current fiscal year, the funds from the Social Security Act are being allotted for 22 different health activities in the states. For some of these purposes states must match the federal grants on a basis equitably worked out through conferences with the state health officers and the Surgeon General of the U. S. Public Health Service.

VENEREAL DISEASE CONTROL ALLOTMENTS

THE U. S. Public Health Service has announced that allotments to the states under the Venereal Disease Control Act of 1938 have been made on the basis of population, financial need, and the scope of the venereal disease problems, as provided in the Act. These funds must be supplemented by the States under regulations laid down by the Surgeon General. Of the $3,000,000 appropriated, $2,400,000 will be distributed to the states and the remaining $600,000 will be reserved by the Public Health Service for research and investigation, education and administrative expenses.

OHIO VENEREAL DISEASE PROGRAM

IT is announced, by Walter H. Hartung, M.D., Ohio State Health Director, that the State Health Department is starting a drive against venereal diseases, the program to be financed by state and federal funds. The plan is to expand venereal disease clinics in the larger cities by increasing the number of physicians, technicians, and clerks.

DELAWARE RIVER POLLUTION CONTROL

A RECIPROCAL agreement to correct and control stream pollution within the Delaware River Drainage Basin has been entered into by the 4 states of New York, New Jersey, Pennsylvania, and Delaware. The agreement was prepared under the auspices of the Interstate Commission on the Delaware River Basin and was formally ratified and made operative by the Departments of Health of the 4 states.

Minimum requirements relating to sewage, industrial waste, and other artificial polluting matter have been established. Because of the variable factors of location, size, character, and flow, and the many varied uses of the water of the Delaware River, the stream has been divided into 4 zones and minimum requirements have been drafted to meet the conditions of each zone. No sewage, industrial waste, or other polluting matter may be discharged into the river unless it has been so treated as to produce an effluent which will meet the minimum standards set up by the terms of the agreement.

LEAGUE COMMITTEE ON HEALTH INDICES

A COMMITTEE on Health Indices of the Health Committee of the League of Nations has been appointed to study further the problem of schedules for indices so that the state of health of a given area may more readily be determined.

Reginald M. Atwater, M.D., Executive Secretary of the American Public Health Association, has been appointed a member of the Committee which will meet in Geneva, October 8–11. Other members of the committee include Dr. M. Greenwood, Professor at the London School of Hygiene and Tropical Medicine; Dr. J. Tomcsik, Director of the State Institute of Hygiene, Budapest; Dr. M. Kacprzak, Chief of the Service of Health Statistics, at the State Institute of Hygiene, Warsaw, and Dr. A. Höjer, Director General of the Health Services of Sweden.

INTERNATIONAL NOMENCLATURE OF DISEASES

THE United States Government has designated representatives to attend the Paris meeting, beginning October 3, of the International Commission for the Decennial Revision of the International Nomenclature of Diseases. George H. Van Buren, Secretary, Jessamine S. Whitney, Dr. Halbert L. Dunn, Thomas J. Duffield, Dr. W. J. V. Deacon, and Dr. George Baehr. The above persons are members of the Sub-Committee on Accuracy of Certified Causes of Death of the American Public Health Association. In addition, Dr. Edwin F. Daily of the Children's Bureau, Selwyn D. Collins, Ph.D., and W. Thurber Fales, Sc.D., have been designated.

PROTEST OF MASSACHUSETTS PUBLIC HEALTH ASSOCIATION

THE Massachusetts Public Health Association has passed a resolution of protest against the report of the National Health Officers Qualifying Board to the United States Conference of Mayors, which was published in the *Journal* for January, 1938, pages 110–111.

The resolution points out that experience in the United States is rich in the demonstrated fact that non-medical health officers as well as medical health officers have administered public health work with outstanding success when they are adequately prepared by training, experience, and personality for the conduct of such work; pointing further to the fact that non-medical scientifically trained public health workers, skilled in engineering, bacteriology, chemistry, physics, sanitation, vital statistics, nutrition, public health education, and other scientific but non-

medical pursuits, have shown administrative ability and success.

The Massachusetts Association records its opposition to the report of the National Health Officers Qualifying Board to the United States Conference of Mayors in so far as the report excludes properly trained and otherwise qualified non-medical public health workers from serving as health officers.

The resolution stipulates that, in so far as this report recognizes the importance of adequate public health training and experience as prerequisites for qualified and efficient public health administrative work, the report has the hearty approval and endorsement of the Massachusetts Public Health Association.

RED CROSS NURSING SERVICES UNDER ONE HEAD

THE various nursing services of the American Red Cross are being unified and Mary Beard, R.N., who since 1924 has been Associate Director of the International Health Division of the Rockefeller Foundation, has been appointed national Director of the Service. Virginia Dunbar, R.N., Assistant Director of the University of California School of Nursing at San Francisco, has been appointed Assistant Director. Both Miss Beard and Miss Dunbar assume their new duties October 1.

Ida F. Butler, R.N., who has been identified with the Red Cross Nursing Service for more than 20 years, and who has been Director of Nursing Enrollment since 1936, retires from active service this fall.

LESLIE DANA MEDAL

THE National Society for the Prevention of Blindness has announced that the Leslie Dana Gold Medal, awarded annually for outstanding achievements in the prevention of blindness and the conservation of vision, has been presented this year to Dr. Ellice M. Alger, Professor of Ophthalmology and hospital surgeon at the New York Post Graduate Medical School.

NEW YORK SOCIETY OF TROPICAL MEDICINE

DR. Philip Manson-Bahr, Lecturer at the London School of Hygiene and Tropical Medicine and Physician to the Hospital for Tropical Diseases, Endsleigh Gardens, London, was guest speaker at a meeting of the New York Society of Tropical Medicine, at the New York Hospital, September 30.

He spoke on Tropical Sprue.

BRITISH MATERNAL AND INFANT MORTALITY

WALTER ELLIOT, British Minister of Health, has announced the lowest maternal mortality rate in England and Wales in history. A rate of 3.1 per 1,000 births places Great Britain among the nations with the lowest national records; and the infant mortality rate of 58 per 1,000 births compares with the lowest on record for Great Britain of 57 in the year 1935.

Commenting on a slight increase in the deaths from tuberculosis, Mr. Elliot said: "We cannot afford to lose every year nearly 30,000 persons from tuberculosis and nearly 70,000 from cancer, nor can we view with complacency the loss of nearly 2,000 mothers and more than 35,000 children under the age of one.

PERSONALS

Central States

DR. BERT ANDERSON, of Victoria, Kans., has been appointed a member of the Kansas State Board of Health, for a term of 3 years.

MORLEY B. BECKETT, M.D.,† of Allegan, Mich., who recently resigned as County Health Officer, will continue as Director of the Allegan and Van Buren County units.

† Member A.P.H.A.

DR. WALLACE E. CHILDS, of Madison, Ind., was appointed, July 1, Director of District Health Unit No. 1, consisting of Gibson, Pike, Posey, and Warrick Counties.

JAMES A. DOLCE, M.D.,† of Charlotte, Mich., has been appointed Assistant Director and County Health Officer of Allegan County.

OTTO K. ENGELKE, M.D., has assumed his duties as Health Commissioner of Adams County, Ohio, where he will reorganize the county health department.

D. CLARE GATES, DR.P.H.,† formerly Field Secretary of the Michigan Joint Committee on Health Education, Ann Arbor, Mich., has been appointed Director of Health Education, North Dakota State Department of Health, Bismarck, N. D., effective August 15.

JOSEPH H. KINNAMAN, M.D.,† of Baltimore, Md., has been appointed Assistant Health Commissioner of Peoria, Ill., with supervision of school health activities, effective August 15.

L. F. HALL, M.D., formerly Health Commissioner of Cuyahoga County, Ohio, has been appointed Commissioner of Health of the City-County Health Department of Helena, Mont., effective September 1.

WALTER H. HARTUNG, M.D., Ohio State Health Director, announces that the State Health Department is starting a drive against venereal diseases, the program to be financed by state-federal funds. The plan contemplates expanding venereal disease clinics in the larger cities by increasing the number of physicians, technicians, and clerks.

BENJAMIN LIEBERMAN, M.D.,† has resigned as Director of School Hygiene in the Milwaukee, Wis., Health Department, to become Director of Health Service at the Milwaukee State Teachers' College.

ROBERT A. LIGHTBURN of Crestline, Ohio, has been appointed to the position of health education secretary and general assistant on the staff of the Onondaga, N. Y., Health Association. Mr. Lightburn was formerly connected with the Ohio Public Health Association.

CLIFTON C. E. MERRITT, M.D.,† of Iron Mountain, Mich., has resigned as Health Officer of Dickinson County, to succeed RAGNAR T. WESTMAN, M.D.,† as Director of the Bay County Department of Health, Bay City, Mich.

DR. ROSCOE T. NICHOLS, of Hiawatha, Kans., has been appointed a member of the Kansas State Board of Health, for a term of 3 years.

RUSSELL E. PLEUNE, M.D.,† of Lansing, Mich., formerly in charge of the Bureau of Venereal Disease Control for the Michigan State Department of Public Health, has been named Director of the Dickinson County health unit, effective September 1. He succeeds CLIFTON E. MERRITT, M.D.†

DR. ALBERT W. RATCLIFFE has been appointed Assistant to DR. CLYDE G. CULBERTSON, Chief of the Bureau of Bacteriology and Pathology of the Indiana State Department of Health.

LEWIS C. ROBBINS, M.D., C.P.H.,† of Indianapolis, Ind., has been appointed Acting Chief of the Bureau of Local Health Administration of the Indiana State Department of Health, during the absence of JOHN W. FERREE, M.D.,† Chief of the Bureau, who begins a year's graduate work at Johns Hopkins University September 1.

OSCAR D. SCHWARTZ, M.D.,† of Detroit, Mich., has been appointed Assistant Director of the Social Hygiene Division of the Detroit Department of Health.

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* Fellow A.P.H.A.
† Member A.P.H.A.

H. J. SHAUGHNESSY, PH.D.,† formerly chief of the Laboratory Service of the Illinois State Department of Health, who during the last year has been a member of the Department of Bacteriology and Public Health at the University of Colorado School of Medicine at Denver, has resigned to resume his former work in Illinois.

V. K. VOLK, M.D.,* of Saginaw, Mich., was recently appointed to fill the newly created position of Medical Superintendent of Saginaw County Hospitals; he is also Health Officer of the County.

ROY B. WEATHERED, M.D.,† of Kansas City, Mo., will succeed LAWRENCE F. STEFFEN, M.D., of El Dorado, Kans., as Health Officer of Butler County.

RAGNAR T. WESTMAN, M.D.,† of Bay City, Mich., has resigned as Director of the Health Department of Bay County.

Eastern States

HENRY D. CHADWICK, M.D.,* Commissioner of Public Health in the Commonwealth of Massachusetts since 1933, has resigned, effective September 1, to accept the position of Medical Director and Assistant Superintendent of the Middlesex County Sanatorium in Massachusetts.

CHARLES F. CHURCH, M.D.,† who for 3 years has been Director of Research of the Rockefeller Nutrition Fund at the Children's Hospital, Philadelphia, Pa., and associate in the Department of Pediatrics, University of Pennsylvania, will resume his work at the School of Public Health, University of Michigan, Ann Arbor, after visiting state departments of health during the summer in New York, Tennessee, Kentucky, and Michigan.

VICTOR G. HEISER, M.D.,* who until recently was an Associate Director of the International Health Division of the Rockefeller Foundation, has been appointed Research Director of the Committee on Healthful Working Conditions of the National Association of Manufacturers, New York, N. Y. It has been announced that a survey of plant conditions will be started and that an information service will be provided for more than 75,000 factories, each of which employs from 25 to 2,000 workers. DONALD M. SHAFER, M.D., formerly of the Medical Department, Standard Oil Company of New Jersey, will be associated with Dr. Heiser.

ERNEST NEWMAN, M.D., C.P.H.,† who for 7 years has been employed as diagnostician in the Bureau of Preventable Diseases, New York City Department of Health, has been appointed Director of the Marathon County Health Unit at Wausau, Wis.

Southern States

DR. NOEL M. AKERS, of Macon, Ga., has been appointed Health Commissioner of Emanuel County.

THOMAS H. BLAKE, M.D.,† of Charleston, W. Va., Director of the Division of Maternal and Child Hygiene, has been named Director of County Health Work of the State Department of Health, succeeding ALBERT M. PRICE, M.D.†

EARL P. BOWERMAN, M.D.,† of Trenton, Tenn., has been named Health Officer of Gibson County.

DR. JOSEPH LINDSAY COOK, of Winston-Salem, Assistant County Health Officer and Medical Superintendent in charge of the Forsyth County Hospital, has resigned to take charge of a syphilis control program in Guilford County, N. C.

WARREN F. DRAPER, M.D.,* Washington, D. C., Assistant Surgeon General, U. S. Public Health Service, and recently Chief of the Division of Personnel and Accounts, has been ap-

* Fellow A.P.H.A.
† Member A.P.H.A.

pointed as the first incumbent of the newly created position of Executive Officer of the U. S. Public Health Service. Dr. Draper, who is a graduate of the Harvard Medical School, has been identified with the Service since 1910 and has had a wide variety of experience in many aspects of public health. For several years prior to 1934, Dr. Draper served as State Health Officer of Virginia.

J. W. ERWIN, M.D.,† of Savannah, Tenn., Health Officer of Hardin County, has been appointed Health Officer of Giles County, Tenn., to succeed DR. WILFRED N. SISK, of Pulaski, who is taking a course in venereal diseases at Johns Hopkins University School of Medicine, Baltimore, Md.

DR. THOMAS K. FAIREY, of Johnston, S. C., has been appointed Health Officer of Union County.

DR. BENJAMIN F. HAND, JR., formerly of Waynesboro, Miss., has been appointed itinerant Health Officer for the Mississippi State Board of Health, to aid county health officers in the examination of preschool children.

DR. ISAAC F. HUDSON is the new Health Officer of Stamford, Tex., succeeding the late DR. NATHAN H. BICKLEY.

LAWRENCE KOLB, M.D., formerly Chief of the U. S. Public Health Service Hospital at Lexington, Ky., has been appointed Assistant Surgeon General in charge of the Division of Mental Hygiene of the Service, succeeding WALTER L. TREADWAY, M.D.

DR. JAMES L. MIMS, of Chester, S. C., has been appointed Health Officer for Jasper County, succeeding DR. JOHN B. WALLACE, of Fountain Inn, who resigned to return to private practice.

THOMAS W. NALE, M.D.,† of Charleston, W. Va., Assistant Director of the Division of Maternal and Child Hygiene of the State Department of Health, has been named Director, to succeed THOMAS H. BLAKE, M.D.†

ALBERT M. PRICE, M.D.,† of Charleston, W. Va., formerly Director of County Health Work in the State Department of Health, has been appointed collaborating epidemiologist and Director of the Division of Communicable Diseases.

DR. DON PRICE, Secretary of the Henderson County Medical Society, has been named Health Officer of Athens, Tex., to succeed DR. JOHN K. WEBSTER.

DR. W. T. RAINEY, formerly of Brownsville, Tenn., has been appointed Health Officer of Lake County, succeeding DR. JAMES P. MOON, of Tiptonville, who is to become a member of the unit in Dyer County.

GUY V. RICE, M.D.,† of Chillicothe, Tex., has been appointed Health Commissioner of Wayne County.

DR. GASTON W. ROGERS, U. S. Army Medical Corps, retired, has been appointed Assistant District Health Officer on a full time basis in charge of Chatham, Person, and Orange Counties, with headquarters in Pittsboro, N. C.

DR. BENJAMIN A. STAFFORD, JR., formerly of Temple, Tex., has been appointed Health Officer of the Sharkey-Issaquena County Unit, succeeding DR. ROBERT H. DEJARNETTE, who was transferred to Alcorn County. Sharkey and Issaquena Counties made joint appropriations for a combined full time health unit with centers in each county.

SENIOR SURGEON PAUL M. STEWART, Washington, D. C., for the past 3 years Medical Director of the U. S. Employees' Compensation Commission, has been appointed Assistant Surgeon General in charge of the Division of Personnel and Accounts, to succeed WARREN F. DRAPER, M.D.*

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* Fellow A.P.H.A.
† Member A.P.H.A.

DR. RICHARD M. STREET, M.D.,† of Laurens, S. C., recently resigned as Health Officer of Abbeville and Laurens Counties.

DR. ROBERT W. TAYLOR, of Lufkin, Tex., has been appointed Health Officer of Lufkin, succeeding DR. DENMAN C. HUCHERSON, resigned.

WALTER L. TREADWAY, M.D., recently Assistant Surgeon General in charge of the Division of Mental Hygiene in the U. S. Public Health Service, Washington, D. C., has been transferred as Medical Officer in charge of the U.S.P.H.S. Hospital in Lexington, Ky., to succeed LAWRENCE KOLB, M.D.

Western States

DR. ADOLPH FRANK BREWER, of Redwood City, Calif., has been appointed Health Officer of Solano County. New full time health units were organized for Solano and Sonoma Counties, effective July 1.

His Majesty, the King of Italy and Emperor of Ethiopia has conferred the Cross of Cavaliere of His Order of the Crown of Italy upon J. C. GEIGER, M.D.,* Director of Public Health of the City and County of San Francisco, Calif., "for services of distinction in the field of public health."

BENJAMIN L. GRIMES,† of Juneau, Alaska, has resigned as Territorial Sanitary Engineer of Alaska, to accept a position with the Oregon State Board of Health, Portland, under CARL E. GREEN,† State Sanitary Engineer.

DR. FRANCIS J. PETER has been appointed Health Officer of Turlock, Calif., succeeding DR. CHARLES E. PEARSON.

DR. PAUL W. SCHRIBER has been appointed Health Officer of Atwater, Calif., succeeding DR. CLARENCE C. FITZGIBBON, of Merced. Dr. Fitzgibbon is Health Officer of Merced County.

DR. FRANK E. SOHLER, JR., has been appointed Health Officer of Cloverdale, Calif., succeeding DR. DONOVAN C. OAKLEAF.

DR. BURTON L. ZINNAMON,† of San Francisco, Calif., has been appointed Health Officer of Sonoma County, effective July 1. The unit was recently placed on a full time basis.

Puerto Rico

EDUARDO GARRIDO-MORALES, M.D., DR.P.H.,* Commissioner of Health of San Juan, Puerto Rico, had the honorary degree of Doctor of Science conferred upon him by Louisiana State University on July 28. Dr. Garrido-Morales is a graduate of the University of Virginia School of Medicine and has a Doctor of Public Health degree from Johns Hopkins University.

Foreign

SILVESTRE LÓPEZ PORTILLO, M.D., M.P.H.,† after obtaining his C.P.H. degree in Boston, Mass., was recently appointed State Health Officer of San Luis Potosí, S. L. P., Mexico. He succeeds FELIPE MALO JUVERA, M.D.,† who is now going to study at the School of Public Health, Johns Hopkins University, Baltimore, Md.

SIR ARTHUR NEWSHOLME,* late Principal Medical Officer of the Local Government Board, was presented with the Jenner Medal of the Royal Society of Medicine, London, at a recent general meeting of the Fellows of the Society. The medal is awarded "for distinguished work in epidemiological research or for preeminence in the prevention and control of epidemic disease."

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* Fellow A.P.H.A.
† Member A.P.H.A.

K. S. VISWANATHAN, M.D., M.P.H.,† has sailed for India after a year spent at the Harvard School of Public Health where he received the Master's degree. He is the Assistant Professor of Hygiene at the Madras Medical College in India.

DEATH

I. MALINDE HAVEY, R.N.,* National Director of Public Health Nursing and Home Hygiene for the American Red Cross, Washington, D. C., died September 7, at the Baker Memorial Hospital, Boston, aged 51. She was buried with national honors in Arlington Cemetery, Washington. Miss Havey was in charge of disaster work during the 1927 Mississippi flood, and the Mississippi and Ohio River floods of 1937. As a nurse during the World War she was twice decorated by the British and French Governments for bravery under fire. Appointed Director of the Public Health Nursing Service more than 12 years ago, she directed Red Cross nursing activities for a time in the New England flood of 1936. Miss Havey, who was born in Stoughton, Wis., and trained in nursing at the Chicago Hospital, made her home in Washington. She became a member of the Association in 1922, and had been a Fellow since 1932.

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* Fellow A.P.H.A.
† Member A.P.H.A.

CONFERENCES AND DATES

American Association of School Health. Kansas City, Mo. October 24–28.

American Association of State Registration Executives. Kansas City, Mo. October 25–28.

American College of Surgeons. New York, N. Y. October 17–21.

American Dental Association. Hotel Statler, St. Louis, Mo. October 24–28.

American Dietetic Association — 21st Annual Meeting. Hotel Schroeder, Milwaukee, Wis. October 9–14.

American Public Health Association — 67th Annual Meeting. Hotels Muehlebach, President, Kansas Citian, Kansas City, Mo. October 25–28.

American Public Works Association. New York, N. Y. October 3–5.

American Society of Civil Engineers. Rochester, N. Y. October 12–14.

American Water Works Association:
Minnesota Section. Minneapolis, Minn. September 29–October 1.
Wisconsin Section. Milwaukee, Wis. October 10–12.
Missouri Valley Section. Hotel Fort Des Moines, Des Moines, Ia. October 13–15.
Southwest Section. Biltmore Hotel, Oklahoma City, Okla. October 17–20.

Association of Dairy, Food and Drug Officials of the United States. Palmer House, Chicago, Ill. October 19–21.

Association of Military Surgeons of the United States. Mayo Clinic, Rochester, Minn. October 13–15.

Association of Women in Public Health —17th Annual Conference. Excelsior Springs, Mo., October 23–24; Kansas City, Mo., October 24.

Conference of State Laboratory Directors. Kansas City, Mo. October 24.

Conference of State Sanitary Engineers. Kansas City, Mo. October 24.

Florida Public Health Association. Hollywood, Fla. November 28–30.

International Association of Milk Sanitarians. Cleveland, Ohio. October 19–21.

International Society of Medical Health

Officers. Kansas City, Mo. October 24.

Medico-Military Inactive Duty Training Unit—under auspices of the Mayo Foundation. Mayo Clinic, Rochester, Minn. October 13–15.

Michigan Public Health Association. Lansing, Mich. November 9–11.

National Association of Housing Officials. Washington, D.C. Oct. 11–14.

National Association of Sanitarians. Phoenix, Ariz. December 10.

National Dairy Association. Columbus, Ohio. October 8–15.

National Public Housing Conference. Washington, D. C. January 20–21, 1939.

National Safety Council. Chicago, Ill. October 10–14.

New Jersey Health and Sanitary Association, Inc.—64th Annual Meeting. Berkeley-Carteret Hotel, Asbury Park, N. J. November 18–19.

New Mexico Public Health Association. Las Vegas, N. M. October 31, November 1–2.

Northern California Public Health Association. January, 1939.

Pacific Association of Railway Surgeons. Los Angeles, Calif. October 7–8.

Southern Branch, American Public Health Association—7th Annual Meeting; and Southern Medical Association. Oklahoma City, Okla. November 15–16.

Symposium on Mental Health. Auspices of the American Association for the Advancement of Science—Section on Medical Sciences. Richmond, Va. December 27–31.

Texas Public Health Association. San Antonio, Tex. November 7–9.

U. S. Public Health Service—Committee on Evaluation of Serodiagnostic Tests for Syphilis, Surgeon General Thomas Parran, Chairman. Assembly of Laboratory Directors and Serologists. Hotel Arlington, Hot Springs National Park, Ark. October 21–22.

FOREIGN

Conference on Rural Hygiene in American Countries. Mexico City, Mexico. November 10–20.

Pan-American Congress of Municipalities. Havana, Cuba. November 14–19.

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